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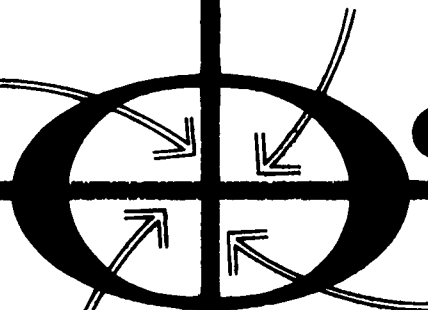
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# Reviews in

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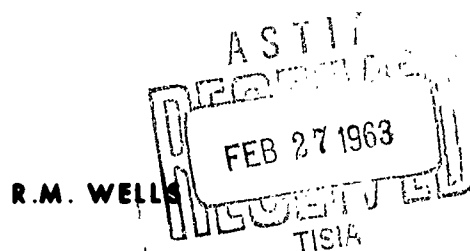
NO. 6

TEMPERATURE FOR NORTH AMERICAN AIR ROUTES

at heights of 5000, 10,000, 15,000, 20,000, 30,000,

40,000 and 53,000 feet

with supplementary surface temperatures



AUGUST 1962

**BOEING**  
TRANSPORT DIVISION

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# ***TEMPERATURE FOR NORTH AMERICAN AIR ROUTES***

**AT HEIGHTS OF 5000, 10,000, 15,000, 20,000, 30,000,  
40,000 AND 53,000 FEET**

**WITH SUPPLEMENTARY SURFACE TEMPERATURES**

**REVIEWS IN GEOPHYSICS NO. 6**

**RAYMOND M. WELLS**

**AUGUST 1962**

**THE BOEING COMPANY  
Transport Division  
Renton, Washington**

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## ABSTRACT

Seasonal and annual great circle route temperatures in degrees Celsius are computed for 50-, 75- and 85-per cent reliabilities of occurrence, i.e. temperatures which are not expected to be exceeded 50, 75 and 85 per cent of the time respectively. The temperatures and their standard deviations are computed over some 2000 selected air routes at the 10,000-, 20,000-, 30,000-, 40,000- and 53,000-foot levels and in addition at the 5000-, 10,000- and 15,000-foot levels for routes  $\leq 400$  nautical miles in length. The great circle distance between termini is also tabulated. A 7090 was used to compute the route temperatures. Input data for the program consist, for each level, of a grid composed of the mean temperature and its standard deviation at the intersection of each  $5^\circ$  of latitude with each  $10^\circ$  of longitude between  $60^\circ\text{S}$  and  $60^\circ\text{N}$  and at the intersection of each  $5^\circ$  of latitude with each  $20^\circ$  of longitude south and north of  $60^\circ\text{S}$  and  $60^\circ\text{N}$  respectively.

Supplementary airport surface temperatures are tabulated by month, quarter, half year and year for the 0, 50, 75, 85, 95 and 100 per cent probability of not being exceeded. Lackey's method, adapted for the 7090, was used to compute the surface temperatures.

## **FORWARD**

In 1962 the Transport Division of The Boeing Company published three documents on equivalent winds over commercial and military air routes. These documents are "Great Circle Equivalent Route Winds for Military Application," D6-9175; "Equivalent Winds For North American Air Routes," D6-9176; and "Equivalent Winds For World Air Routes," D6-9177. As a companion to the "wind books" three documents on route temperature and airport surface temperatures were prepared. These are "Great Circle Route Temperatures For Military Applications," D6-7175; "Temperature For North American Air Routes," D6-7176; and "Temperature For World Air Routes," D6-7177.

The industry and ingenuity of L. W. Stumpf for preparing the route temperature program and of R. C. Langan for preparing the surface temperature program, both of the Engineering Computing and Analysis Staff, are gratefully acknowledged. Thanks are also due Alice Post for preparing the route index and for assisting in preparing the input data.

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## **TEMPERATURE FOR NORTH AMERICAN AIR ROUTES**

**at heights of 5000, 10,000, 15,000,  
20,000, 30,000, 40,000 and 53,000 feet  
with supplementary surface temperatures**

### **I. INTRODUCTION**

Aircraft operate in a thermally dynamic environment. To determine the effect of this environment on the economic capability and carrier suitability over established and new route systems requires knowledge of the long term temperature conditions that can be expected at the terminals, during ascent and descent, and along the flight path. This document is an attempt to provide temperature data to meet some of these needs.

**Route Temperature.** Seasonal and annual great circle route temperatures in degrees Celsius are presented for 50-, 75- and 85-per cent reliabilities of occurrence, i.e. temperatures which are not expected to be exceeded 50, 75, and 85 per cent of the time respectively. These data are presented as the difference between the per cent reliability temperature and the International Standard Atmosphere temperature.

**Airport Temperature.** Surface temperatures in degrees Fahrenheit are computed for each airport. These surface data are organized by month, by quarter, by half year, and by year for the 0, 50, 75, 85, 95 and 100 per cent probability of not being exceeded.

Because of the broad coverage of route systems and of airports, the temperature tabulations are published in three documents: Great Circle Route Temperatures for Military Applications, D6-7175; Temperature for North American Air Routes, D6-7176; and Temperature for World Air Routes, D6-7177.

## II. TEMPERATURE TABULATIONS

### A. METHOD

#### 1. Route Temperatures

Route temperatures were computed on the assumption that the distribution of observed temperatures about its mean at each point along a route approximates the normal or Gaussian distribution. This approximation is closely the case for winds but is generally weaker for temperature, since departures of temperature from normality in the vicinity of the polar tropopause and at levels subjected to surface based inversions are sometimes appreciable. Thus temperature estimates of extreme values and of small ranges can result in large errors at levels subjected to seasonal inversions and at mean tropopause heights. A general formula for the "abnormal" distribution of temperature, however, is not available. The mean route temperature and its standard deviation completely describe the normal distribution.

The mean route temperature is determined by first dividing the route into an integral number of segments 200 miles or less in length. Next a temperature is calculated at the mid point of these segments by averaging the four nearest temperature values which enclose each mid-point. These four temperatures in turn are assigned weighted values in proportion to their proximity to the point. The averages at points along the route are used to compute the temperature for the entire route. With reference to Figure 1, the mean route temperature,  $T_{AB}$  is given by

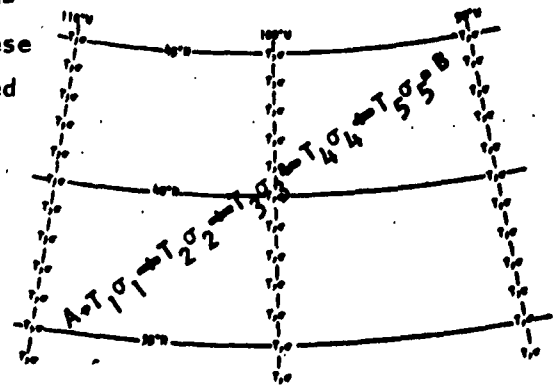


Fig. 1. Route Temperature

$$T_{AB} = \left[ \bar{T}_n \right] \quad (1)$$

where  $\bar{T}_n$  is the time average temperature at the mid point of segment n. The bar denotes a mean over a long period of time while the brackets denote the mean value over the route.

## 2. Standard Deviation

From physical considerations the temperature at points along a route are related to one another<sup>1</sup>. It is therefore necessary to consider the correlation between the temperature at one point and the temperature at another point along the route. While the correlation of temperature with distance varies somewhat with height and region<sup>1</sup>, such refinements were not incorporated in the tabulations because of the lack of published information on the variability of temperature.

As with mean route temperatures, the route standard deviation is computed by calculating the standard deviation at the mid point of each segment (Fig. 1) by averaging the four nearest standard deviation values which enclose each mid point. The four standard deviations are assigned weighted values in proportion to their proximity to the point. The averages at these points along the route are used to compute the standard deviation for the entire route. The expression for computing the route standard deviation,  $\sigma$ , is

$$\sigma = t \left[ \sigma_n^2 \right]^{1/2} \quad (2)$$

where:  $\sigma_n$  = Standard deviation at point n along the route

t = Factor to convert the mean of the standard deviation at points along the route,  $\left[ \sigma_n^2 \right]^{1/2}$ , into the route standard deviation (Table 1).

Table 1. Correlation of Temperature with Distance

Route Length - n. mi.

	0	500	1000	1500	2000	2500	3000	3500	4000
t	1	0.89	0.79	0.73	0.67	0.61	0.55	0.50	0.45

Durst<sup>1</sup> shows that the correlation of north and south wind components with temperature is small. Consequently the point correlation of equivalent winds with temperature is also likely to be small. As a result equivalent winds and route temperatures may be used together without appreciable error.

## 3. Great Circle Distance

Route lengths, in nautical miles are computed over the great-circle course,

i.e. the least distance on a sphere, between terminals. The expression used to compute great circle distances between terminals  $P_1 (\psi_1 \lambda_1)$  and  $P_2 (\psi_2 \lambda_2)$  is

$$D = 60 \cos^{-1} \left[ \sin \psi_1 \sin \psi_2 + \cos \lambda_1 \cos \lambda_2 \right] \quad (3)$$

where:  $D$  = Great circle distance in nautical miles

$\psi$  = Latitude

$\lambda$  = Longitude

$\cos^{-1} [ ]$  = Angle expressed in minutes.

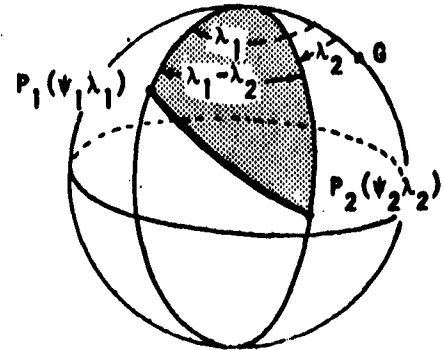


Fig. 2  
Great Circle Distance

South latitudes and east longitudes are considered negative and north latitudes and west longitudes are considered positive.

#### 4. Annual Route Temperature

Annual route temperatures are computed from the seasonal values by an iterative process in which temperatures are found such that 50, 75 and 85 per cent of the total area under all four seasonal temperature distribution curves lies to their left. For example in the hypothetical distribution of seasonal route temperatures in Figure 3, the 50-, 75- and 85-per cent annual temperatures are estimated to be -43, -36 and -32 respectively.

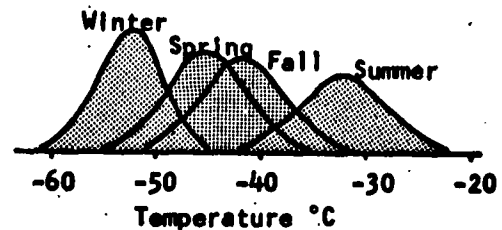


Fig. 3. Hypothetical Seasonal Temperature Distribution

#### 5. Airport Temperature

Lackey's<sup>2</sup> method was used to compute surface reliability temperatures from the monthly mean, extreme minimum and the extreme maximum temperatures. This technique, as Lakcey states, "depends on the statistically demonstrated area-wide similarity of the normalized cumulative frequency curves of observed hourly temperature for given positions of the mean between the absolute extremes."

The substance of Figure 6 was integrated into a 7090 program. This program with the mean, extreme minimum and extreme maximum temperature as input

data, was used to compute surface reliability temperatures.

## B. INPUT DATA

### 1. Route Temperatures

The input data for the 7090 program used to compute route temperatures were obtained principally from Upper Air Temperature Over The World<sup>3</sup>. For each level the data consist of grids composed of the mean temperature and its standard deviation at the intersection of each 5° of latitude with each 10° of longitude between 60°S and 60°N and at the intersection of each 5° of latitude with each 20° of longitude north of 60°N and south of 60°S.

The temperature grids are prepared for the 5000- (850 mb), 10,000- (700 mb), 15,000-, 20,000- (500 mb), 30,000- (300 mb), 40,000- (200 mb) and 53,000- (100 mb) foot levels for each of the four mid season months: January, April, July and October.

### 2. Airport Temperatures

The mean, extreme minimum and extreme maximum temperatures used to compute surface temperatures for given reliabilities of occurrence were obtained from United States<sup>4,5</sup>, English<sup>6</sup>, Canadian<sup>7,8</sup>, and German<sup>9</sup> climatic summaries.

## C. TABULATIONS

### 1. Route Temperature

Mid season monthly 50-, 75- and 85-per cent reliability temperatures and their standard deviations and the annual 50-, 75- and 85-per cent reliability temperatures are computed at the 10,000-, 20,000-, 30,000-, 40,000- and 53,000-foot levels for about 2000 air routes (Table 5). Supplementary temperatures at the 5000-, 10,000- and 15,000-foot levels are computed for routes of length  $\leq 400$  n. mi. (Table 6). The tabulations are arranged such that route temperatures are given as the difference between reliability route temperatures and the International Standard Atmosphere temperature. The mean route temperature for each season is also tabulated. Across from each route pair is listed the great circle distance separating the terminals. The tabulations are ordered alphabetically by the terminals that identify each route. In the index each route is referenced under both of its terminals (Table 9).

An alphabetical listing of terminals with their airport names, geographical coordinates, elevation, and length of longest runway is presented in Table 8.

## 2. Airport Temperature

An alphabetical listing of airport monthly, quarterly, semi-annual and annual surface temperature for 0- (extreme minimum), 50- (mean), 75-, 85-, 95- and 100- (extreme maximum) per cent probability of not being exceeded are tabulated (Table 7). The average daily maximum temperature is also tabulated.

### III. USE OF TABLES

#### A. ROUTE TEMPERATURE RELIABILITIES

Two methods are presented for computing route temperatures for reliability values in addition to those tabulated. While these methods apply only to observations which follow the "normal" law, as stated in Upper Air Temperatures Over The World<sup>3</sup>, "reasonable estimates of the range of temperature can be made wherever the standard deviation does not exceed (as a rough guide) about  $4^{\circ}\text{C}$ ". It is further stated that even at levels affected by surface inversions (in January: 700 and 500 mb in Alaska, Canada and the U.S.S.R. and at 700 mb in Japan and Korea) and at levels near varying polar tropopause (in January and April: 200 and 150 mb in Canada and 200 mb in the United States, British Isles, south Scandinavia and central Europe) a rough estimate can still be made of the temperature range which includes about 80 per cent of the observations. Because of the abnormal shape of the frequency distribution, estimates of smaller ranges or of extreme values will be very badly in error.

#### 1. Error Factor Method

Route temperature reliabilities are computed by adding the product of  $k$  times the route standard deviation (tabulated values) to the mean route temperature, where  $k$  is a factor derivable from the error function. Values of  $k$  are given in Table 2 and are illustrated in Figure 4. Use of Table 2 is illustrated in computing the 85 per cent reliability temperature over the San Francisco to New York route during summer at 40,000 feet. From Table 5 the mean July temperature is  $-55^{\circ}\text{C}$  and the standard deviation is  $3^{\circ}\text{C}$ . The estimated long term route temperature which is not exceeded 85 per cent of the time is  $-52^{\circ}\text{C}$  or about  $5^{\circ}\text{C}$  warmer than the ISA temperature at 40,000

feet, i.e.

$$-55 + (1.04 \times 3) = -51.9^{\circ}\text{C and}$$

$$-51.9 - (-56.5 \text{ (ISA)}) \approx 5^{\circ}\text{C.}$$

For some problems it may be necessary to compute the temperature range over a route within which a given per cent of observations lie. Such route temperature ranges may be computed with aid of Table 3. In the above example 80 per cent of the route temperatures at 40,000 feet in July over the San Francisco to New York route lie within  $-55 \pm (1.28 \times 3)$ , i.e. between  $-51^{\circ}\text{C}$  and  $-59^{\circ}\text{C}$ .

## 2. Arithmetic Probability Paper Method

Arithmetic probability paper is arranged with the per cent cumulative frequency scale printed on the ordinate such that the integral

$$Q(x) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^x e^{-x^2/2} dx \quad (4)$$

of the normal frequency curve plots as a straight line while the abscissa has a linear scale. Thus, to obtain a frequency distribution of say the route temperature during summer at 40,000 feet over the San Francisco to New York route, look up the 50 per cent ( $-55^{\circ}\text{C}$ ) route temperature and its standard deviation ( $3^{\circ}\text{C}$ ) in Table 5. Next plot  $-55$  on the 50 per cent value of the ordinate scale and  $-52^{\circ}\text{C}$  ( $-55 + 3$ ) on the 84 per cent ordinate value and draw a straight line through these points. See Figure 5. Use of arithmetic probability paper is illustrated with two examples.

- 85 per cent of route temperatures are less than  $-51.9^{\circ}\text{C}$
- Between 10 and 90 per cent of the time route temperatures range between  $-58.8^{\circ}\text{C}$  and  $-51.2^{\circ}\text{C}$ .

Table 2.  
Error Factor

%	k
50	0.0
55	0.125
60	0.25
65	0.385
70	0.52
75	0.67
80	0.84
85	1.04
90	1.28
95	1.65

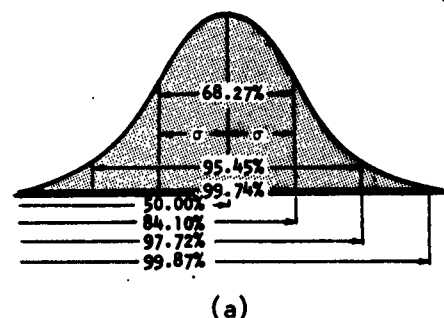


Table 3.  
Range Factor

%	r
20	0.25
30	0.39
40	0.53
50	0.67
60	0.84
70	1.04
80	1.28
90	1.65
95	1.96
99	2.58

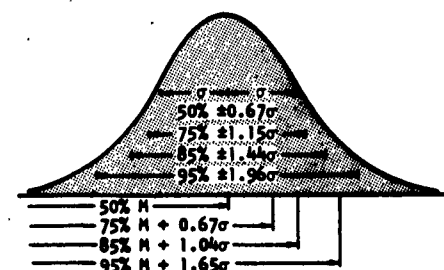


Fig. 4b. Normal Curve

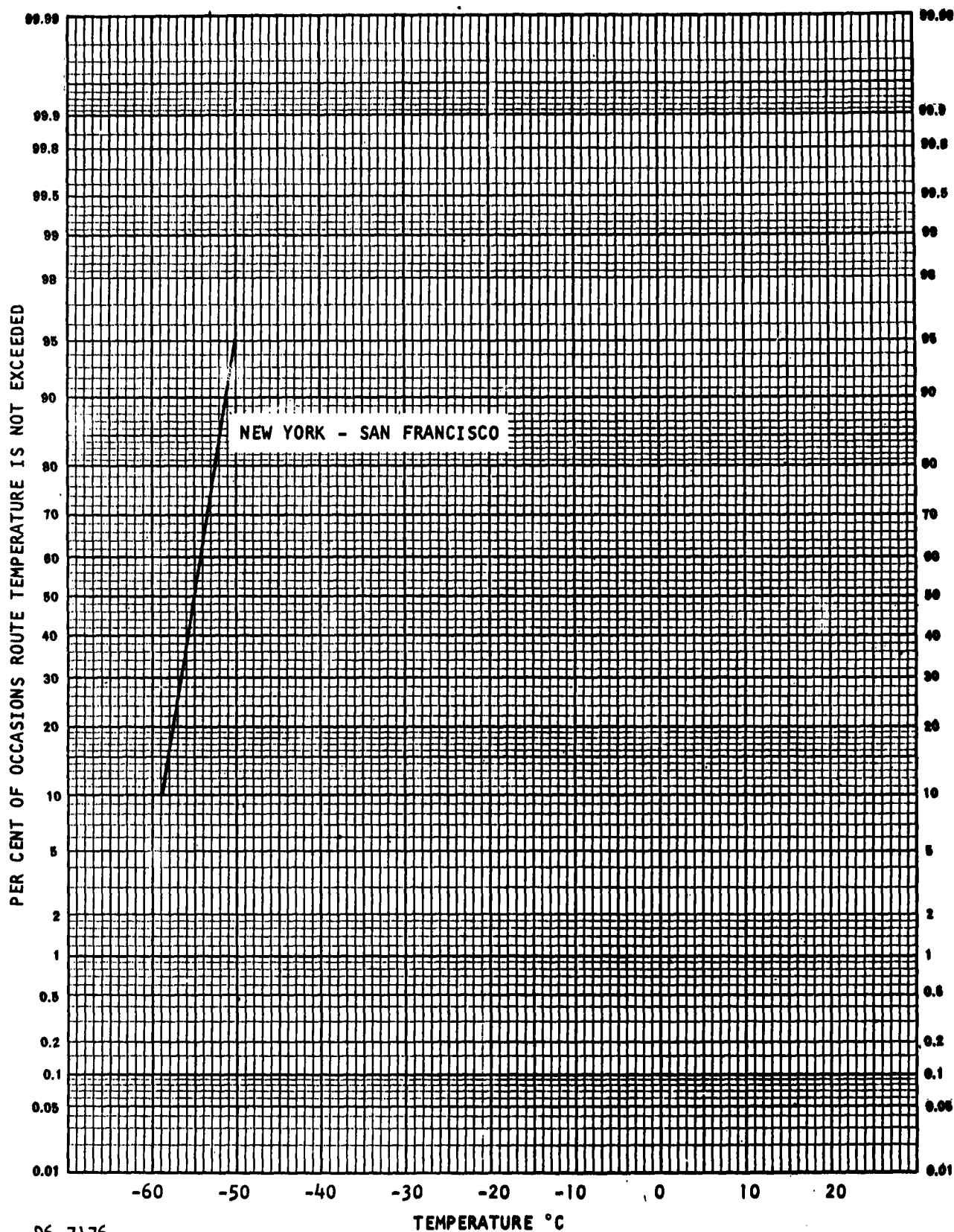


FIGURE 5. ARITHMETIC PROBABILITY PAPER

## B. GREAT CIRCLE ROUTE LENGTH

The route length in nautical miles is computed over the great-circle course, i.e. the least distance on a sphere, between terminals (Fig. 6). A nautical mile is the length of one minute of arc along a great circle on the earth's surface, i.e. the earth's circumference is  $360 \times 60 = 21,600$  n. miles. For example the great circle distance between San Francisco ( $+37^{\circ}38'$ ,  $+122^{\circ}23'$ ) and New York ( $+40^{\circ}38'$ ,  $+73^{\circ}47'$ ) may be computed from (3).

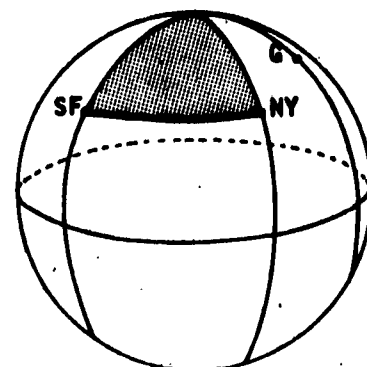


Fig.  
Great Circle Route Length

$$D = 60 \cos^{-1} \left[ \sin \psi_1 \sin \psi_2 + \cos \psi_1 \cos \psi_2 \cos (\lambda_1 - \lambda_2) \right] \quad (3)$$

With the aid of Table 4,

$$\begin{aligned} D &= 60 \cos^{-1} \left[ \sin(40^{\circ}38') \sin(37^{\circ}38') + \cos(40^{\circ}38') \cos(37^{\circ}38') \cos(48^{\circ}36') \right] \\ &= 60 \cos^{-1} [ .7951 ] \\ &= 2240 \text{ n. mi.} \end{aligned}$$

Table 4. Reference Trigonometric Relationships

$$\begin{aligned} \sin(90 + \psi) &= \cos \psi & \cos(90 + \psi) &= -\sin \psi \\ \sin(90 - \psi) &= \cos \psi & \cos(90 - \psi) &= \sin \psi \\ \sin(-\psi) &= -\sin \psi & \cos(-\psi) &= \cos \psi \end{aligned}$$

## C. AIRPORT TEMPERATURES

### 1. Hourly Temperature Nomograph

Surface temperatures for reliabilities of not being exceeded can be computed by mean of the Hourly Temperature Nomograph<sup>2</sup> (Fig. 7). Use of this nomograph is explained with an example. To compute the July 95 per cent reliability temperature at an airport, it is first necessary to know the July mean, extreme minimum and extreme maximum temperatures. Let these values be  $72^{\circ}\text{F}$  (mean),  $50^{\circ}\text{F}$  (minimum) and  $104^{\circ}\text{F}$  (maximum).

Step One: Normalization to a 100 - scale

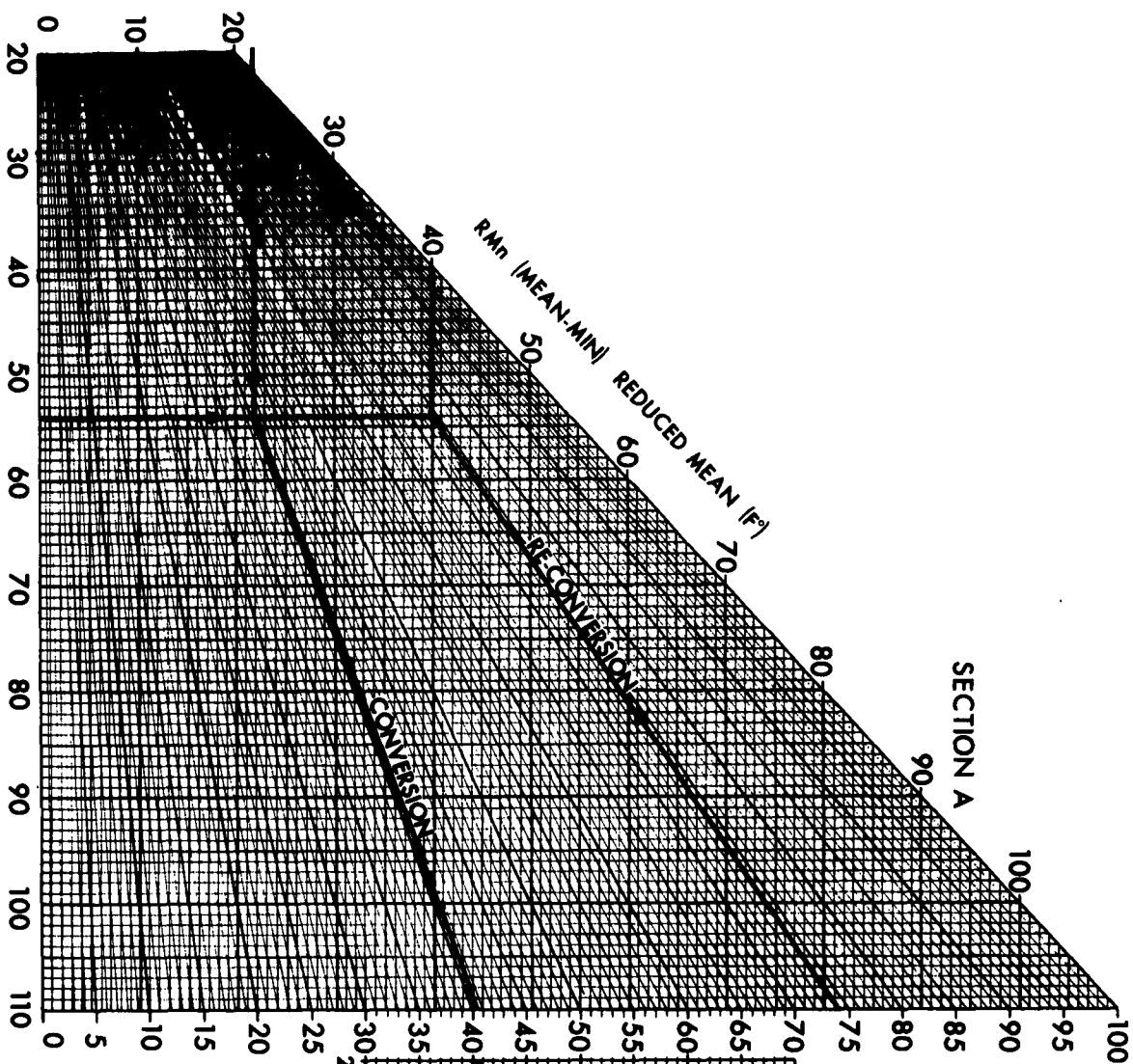
Subtract the extreme minimum from the mean to obtain the reduced mean (RMn). Next subtract the mean from the extreme maximum to obtain the reduced maximum (RMx).

$$\text{RMn} = 72 - 50 = 22^{\circ}\text{F}$$

$$\text{RMx} = 104 - 50 = 54^{\circ}\text{F}$$

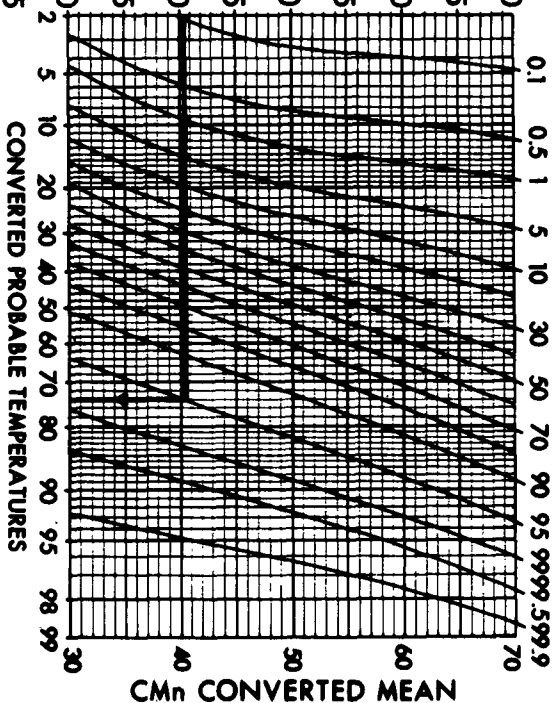
# HOURLY TEMPERATURE NOMOGRAPH

CT CONVERTED  
TEMPERATURE



## SECTION B

PERCENTAGE RELATIONS BETWEEN CONVERTED  
MEANS AND CONVERTED PROBABLE TEMPERATURES



$$CMn = \frac{100 \cdot Mn - Mi}{Mx - Mi}$$

$$PT (Fah) = CT \left( \frac{Mx - Mi}{100} \right) + Mi$$

## Step Two: Converted Probable Temperature - PT

At the intersection of RMn and RMx on Section A of the nomograph draw a straight line along the sloping diagonal to obtain the converted mean (CMn) on the converted temperature scale, i.e. CMn = 40.7°.

$$\begin{aligned} \text{CMn} &= \frac{100 (M_n - M_i)}{M_x - M_i} \\ &= \frac{100 (72 - 50)}{104 - 50} = 40.7 \end{aligned} \quad (5)$$

Next enter Section B of the nomogram across to the desired 95 per cent probability sloping line. Read the converted probable temperature at the bottom of Section B, i.e. CT = 74°.

## Step Three: Reconversion

Next enter the converted temperature scale at 74° and follow down the sloping line to the intersection with RMx = 54° and then across to the corresponding reduced mean, i.e. RMn = 40°F. The 95 per cent reliability temperature is now obtained by adding the extreme minimum to the reduced mean, i.e. 50 + 40 = 90°F, or alternatively,

$$\begin{aligned} \text{PT} &= \text{CT} \cdot \frac{M_x - M_i}{100} + M_i \\ \text{PT(95\%)} &= 74 \cdot \frac{104 - 50}{100} + 50 = 90^\circ\text{F} \end{aligned} \quad (6)$$

**Reliability:** Hourly temperature records for twenty stations ranging in latitude between 12°N and 70°N were used to prepare the Hourly Temperature Nomograph. The performance of the nomograph was then tested on 40 different and widely scattered stations. For each station, the actual three essential items for each of the four mid season months were processed by the nomograph to determine 13 percentile levels (1,5,10...99%). The hourly temperature frequencies so computed were compared with the actual recorded frequencies. The results of this test revealed that the nomograph is most accurate during summer and that 91 per cent of the divergencies were less than 3°F and 98 per cent were less than 5°F.

## 2. Alternate Method for Estimating Airport Reliability Temperatures

In the event that the extreme maximum and extreme minimum monthly temperatures

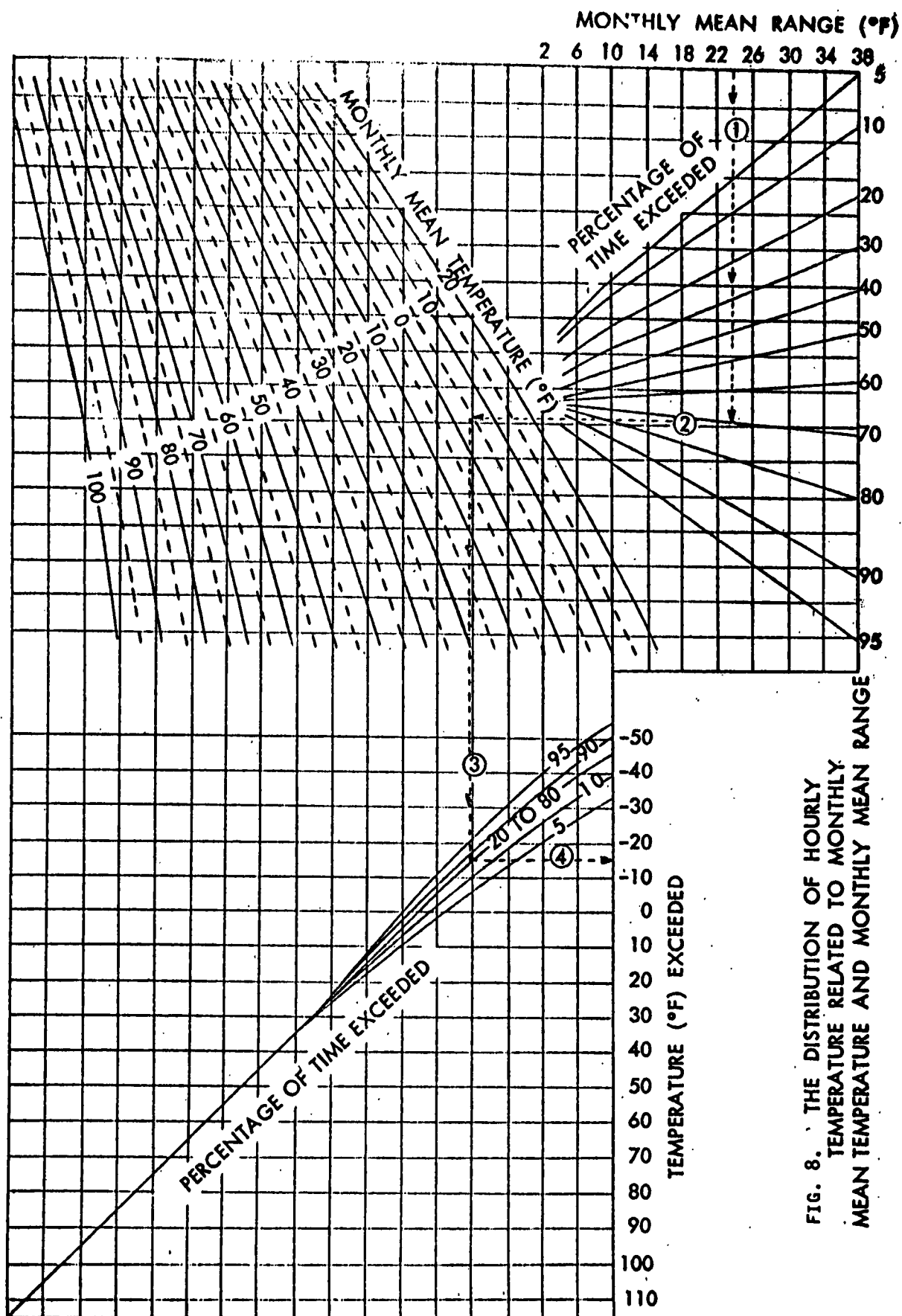


FIG. 8. THE DISTRIBUTION OF HOURLY TEMPERATURE RELATED TO MONTHLY MEAN TEMPERATURE AND MONTHLY MEAN RANGE

are not available for an airport, reliability surface temperatures can be estimated from the monthly mean and monthly mean daily maximum (average daily maximum) temperatures by means of a nomogram<sup>10</sup> developed by the Air Weather Service. The nomogram is based on a graphical correlation method which was used to develop the joint functions between the mean and the monthly mean range and the distribution of hourly temperatures to avoid any assumption concerning the slope of the hourly temperature distribution. The monthly mean range in temperature is the absolute difference between the monthly mean daily maximum and mean daily minimum temperatures or twice the difference between the monthly mean daily maximum and the monthly average daily temperature.

Use of the nomogram is illustrated by estimating the temperature which is exceeded 70 per cent of the time at a station with a January mean monthly temperature of  $-5^{\circ}\text{F}$ , a mean maximum temperature of  $7^{\circ}\text{F}$  and a monthly range of  $24^{\circ}\text{F}$ ,  $2 \times [7 - (-5)]^{\circ}\text{F}$ .

Step One. Enter the graph at  $24^{\circ}$  in the monthly mean range axis and proceed vertically downward to the 70 per cent line (Fig. 8).

Step Two: From this intersection proceed horizontally to the  $-5^{\circ}\text{F}$  monthly mean temperature isopleth.

Step Three: From this point proceed vertically downward to the intersection with the 20 to 80 per cent line and then go horizontally to the temperature exceeded axis where the temperature estimate of  $-14.8^{\circ}\text{F}$  is obtained. Conversely, by proceeding from  $-14.8^{\circ}\text{F}$  in the reverse order, the per cent of time that this temperature is exceeded is estimated to be 70 per cent.

### 3. Aerodrome Reference Temperature

For some purposes the Aerodrome Reference Temperature (A.R.T.) is used as a conservative measure of airport temperature. The A.R.T. is defined as

$$\text{A.R.T.} = T_1 + \frac{T_2 - T_1}{3} \quad (7)$$

where:  $T_1$  = the monthly mean temperature for the hottest month of the year (that which has the highest mean daily temperature).

$T_2$  = the monthly mean daily maximum temperature for the hottest month.

To use temperature scales, place straight-edge on temperature corresponding to  $T_1$  and  $T_2$  on the outer scale and read A.R.T. from center scale.

With the aid of Figure 9, the A.R.T. at Boston with  $T_1$  (July) = 72°F and  $T_2$  = 80°F is 74.7°F, or

$$\text{A.R.T.} = 72 + \frac{80 - 72}{3} = 74.7^\circ\text{F}$$

#### IV. STANDARD ATMOSPHERES

##### A. INTERNATIONAL STANDARD ATMOSPHERE

A standard atmosphere is a hypothetical vertical distribution of atmospheric temperature, pressure and density which by international or national agreement is taken to be representative of the atmosphere for the purpose of altimeter calibrations, aircraft design and performance calculations, etc. The internationally accepted standard atmosphere is called the International Civil Aeronautical Organization (ICAO) standard atmosphere or the International Standard Atmosphere (ISA) (Fig. 10). It should be emphasized that this model will never completely match the actual atmosphere and only rarely will it approximate the average value at all altitudes simultaneously.

The ISA atmosphere is a self consistent model in which no water vapor is assumed and the air is assumed to obey the perfect gas law,  $p = PM/TR$ , and the hydrostatic equation,  $dP = -g \rho dZ$ , which when taken together yield the barometric equation which relates temperature, pressure and density variations in the vertical

$$d \ln P = - gM/TR \quad dZ \quad (8)$$

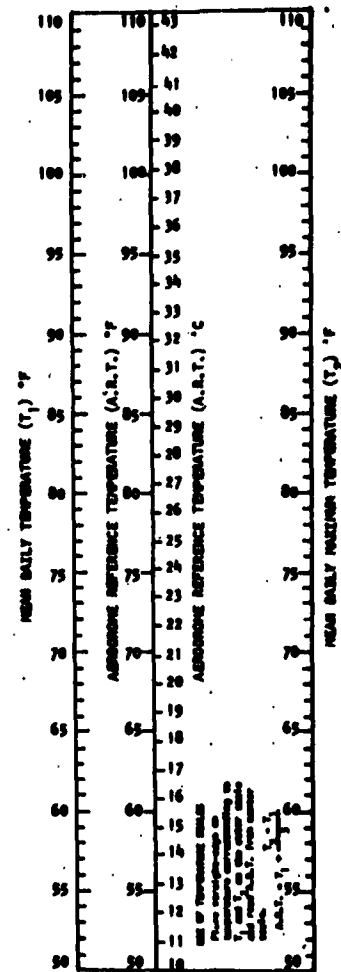


Fig. 9

where:  $\rho$  = mass density  
 $P$  = pressure  
 $M$  = mean molecular weight of air  
 $T$  = temperature in degrees absolute  
 $R$  = universal gas constant  
 $g$  = acceleration of gravity  
 $Z$  = geometric altitude

For calculating pressures below 100,000 feet,  $g$  and  $M$  are usually assumed constant.

## B. EXTREME ATMOSPHERES

Atmospheres representative of extreme conditions likely to be encountered over geographical areas of the world are briefly discussed.

### 1. Arctic Winter Atmosphere

This atmosphere is based on the average January temperature for selected pressure surfaces between 60°N and 90°N. January is representative of the coldest month in the Arctic. The atmosphere is hydrodynamically consistent.

### 2. Arctic Summer Atmosphere

This atmosphere is based on the average July temperature for selected pressure surfaces between 60°N and 90°N. July is the warmest month in the Arctic. This atmosphere is also hydrodynamically consistent.

### 3. Tropical Atmosphere

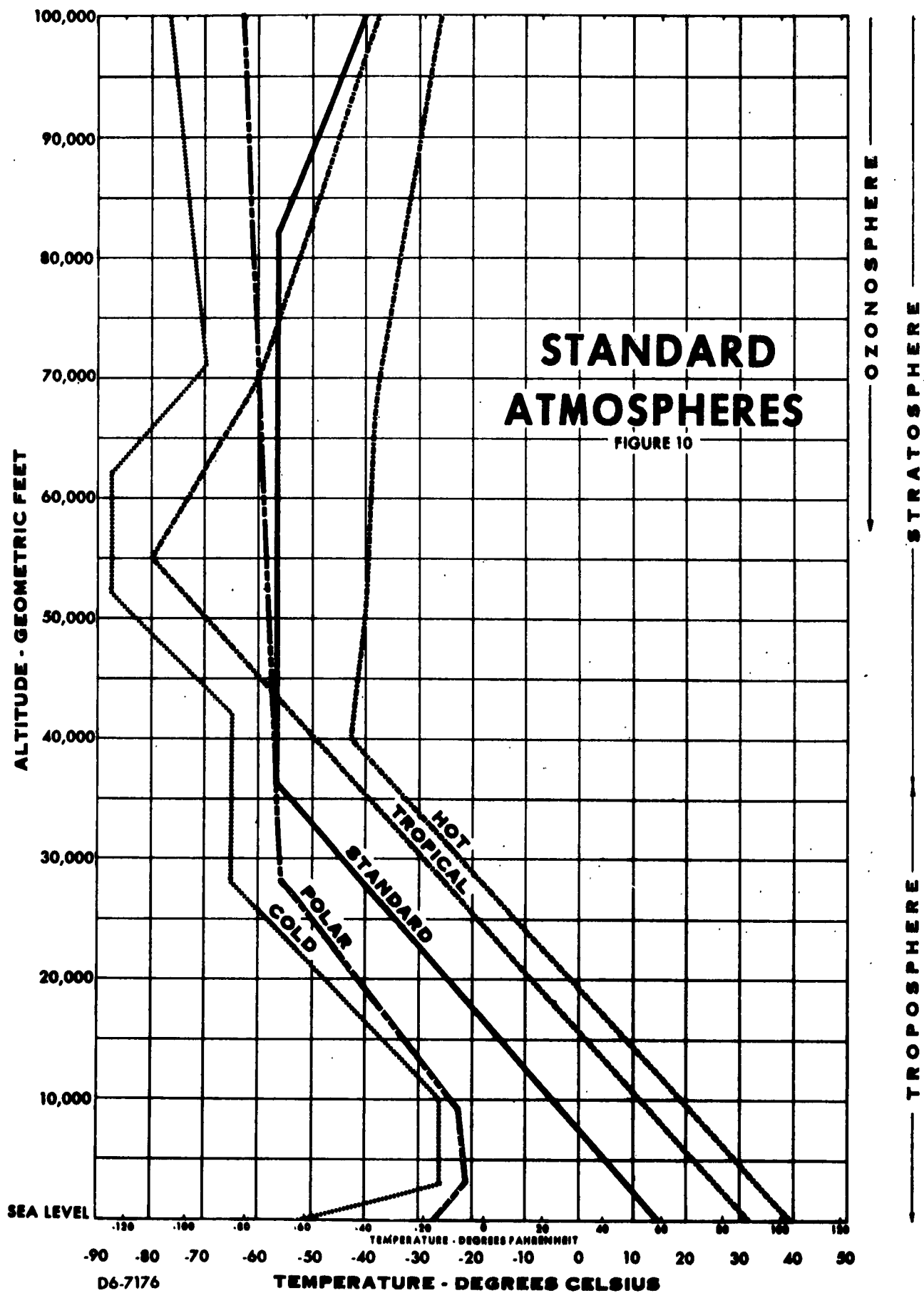
This atmosphere represents conditions which may be encountered between 30°S and 30°N except for desert areas and certain parts of the ocean.

### 4. Hot Atmosphere

The hot atmosphere represents temperature extremes which are exceeded only 10 per cent of the time in the hottest geographical areas.

### 5. Cold Atmosphere

The cold atmosphere represents temperature extremes which are exceeded 90 per cent of the time in the coldest geographical areas.

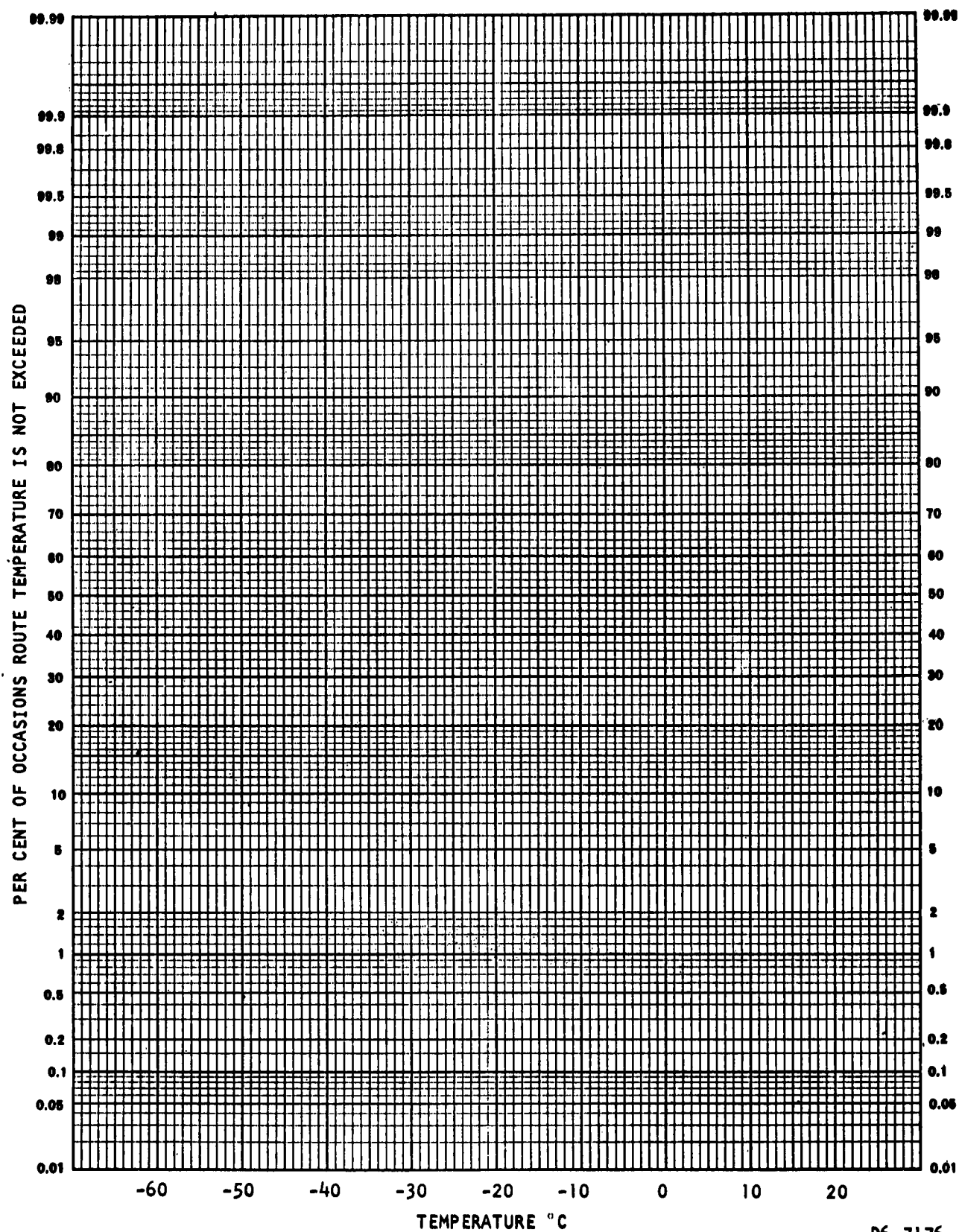


# STANDARD ATMOSPHERES

FIGURE 10

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PER CENT OF OCCASIONS ROUTE TEMPERATURE IS NOT EXCEEDED

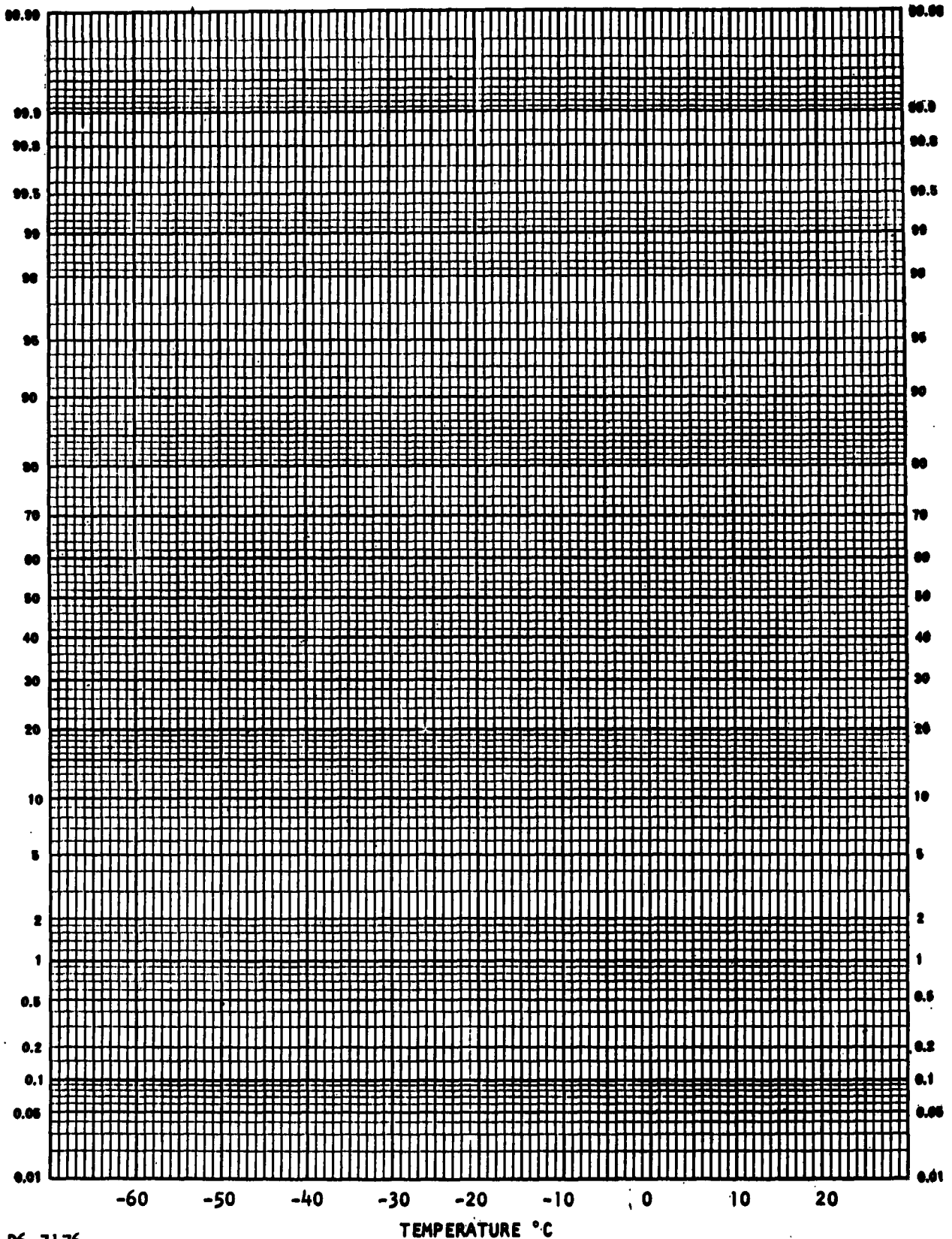


TABLE 5

ROUTE TEMPERATURES AT THE 10,000-, 20,000-,  
30,000-, 40,000- AND 53,000-FOOT LEVELS



















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## ENROUTE TEMPERATURES AND STANDARD DEVIATION IN DEGREES CELSIUS FOR GREAT CIRCLE AIR ROUTES

ENROUTE TEMPERATURES AND STANDARD DEVIATION IN DEGREES CELSIUS FOR GREAT CIRCLE AIR ROUTES																										
HEIGHT IN FEET	ISA TEMP.	ENROUTE TEMPERATURE												STANDARD DEVIATION												
		JANUARY				APRIL				JULY				OCTOBER				ANNUAL				JAN	APR	JUL	OCT	
		50	D50	D75	D85	50	D50	D75	D85	50	D50	D75	D85	50	D50	D75	D85	50	D50	D75	D85					
DALLAS TO DENVER																										
53,000	-56.5	-64	-8	-5	-4	-62	-6	-3	-2	-67	-11	-9	-8	-68	-11	-9	-8	-65	-9	-6	-4	4	4	3	3	
40,000	-56.5	-56	0	4	6	-58	-2	1	3	-54	2	4	5	-56	1	3	5	-56	0	2	3	6	5	2	4	
30,000	-44.5	-46	-1	1	2	-43	1	3	4	-33	11	12	13	-39	5	7	9	-40	4	7	8	3	3	2	3	
20,000	-21.2	-20	1	4	6	-16	5	8	9	-7	14	16	16	-11	10	12	13	-14	8	10	12	5	4	2	3	
10,000	-4.6	-4	0	4	6	3	7	10	12	11	16	17	18	5	10	13	14	4	8	11	13	5	5	2	4	
DALLAS TO EL PASO																										
53,000	-56.5	-67	-11	-8	-7	-65	-8	-6	-5	-70	-13	-11	-10	-71	-14	-12	-11	-68	-12	-9	-7	3	4	3	3	
40,000	-56.5	-56	0	3	5	-58	-2	1	3	-54	2	4	4	-55	1	3	4	-56	1	2	3	5	4	2	3	
30,000	-44.5	-43	1	3	4	-42	3	5	6	-32	12	13	14	-37	7	9	10	-39	6	8	10	3	3	2	3	
20,000	-21.2	-17	5	7	9	-14	7	10	11	-6	15	16	17	-10	11	13	14	-12	10	12	13	4	3	1	3	
10,000	-4.6	-0	4	7	9	5	10	13	14	12	16	17	18	7	12	14	15	6	10	13	14	5	4	2	3	
DALLAS TO FT. WORTH																										
53,000	-56.5	-67	-11	-8	-7	-65	-8	-6	-4	-69	-13	-11	-10	-71	-14	-12	-11	-68	-11	-8	-7	3	4	3	3	
40,000	-56.5	-57	-0	3	4	-58	-2	1	2	-54	2	4	4	-55	1	3	4	-56	0	2	3	4	4	2	3	
30,000	-44.5	-43	2	3	4	-41	3	5	6	-33	12	13	14	-37	7	9	10	-38	6	8	10	3	3	2	3	
20,000	-21.2	-17	5	7	8	-14	8	10	11	-6	15	16	17	-10	11	13	14	-12	10	12	13	4	3	2	3	
10,000	-4.6	-1	4	7	8	5	9	12	13	10	15	16	17	7	12	14	15	5	10	12	13	4	4	2	3	
DALLAS TO HOUSTON																										
53,000	-56.5	-68	-12	-10	-9	-66	-10	-7	-6	-70	-13	-12	-11	-72	-16	-14	-12	-69	-13	-10	-8	3	4	2	3	
40,000	-56.5	-57	-0	2	4	-58	-1	1	3	-54	2	3	4	-55	1	3	4	-56	0	2	3	4	4	2	3	
30,000	-44.5	-41	3	5	6	-40	4	6	7	-32	12	13	14	-37	8	10	11	-38	7	9	10	2	2	2	3	
20,000	-21.2	-15	6	8	10	-13	8	11	12	-6	15	16	17	-9	12	14	15	-11	11	13						

\*D--DIFFERENCE BETWEEN INDICATED PER CENT RELIABILITY TEMPERATURE AND INTERNATIONAL STANDARD ATMOSPHERE TEMPERATURE.











## ENROUTE TEMPERATURES AND STANDARD DEVIATION IN DEGREES CELSIUS FOR GREAT CIRCLE AIR ROUTES

HEIGHT IN FEET	ISA TEMP.	ENROUTE TEMPERATURE										STANDARD DEVIATION			
		JANUARY		APRIL		JULY		OCTOBER		ANNUAL		JAN	APR	JUL	OCT
		50+050	D75 D85	50 D50	D75 D85	50 D50	D75 D85	50 D50	D75 D85	50 D50	D75 D85				
DETROIT TO LOUISVILLE															
53,000	-56.5	-61	-5	-2	-1	-59	-3	-0	1	-63	-7	-4	-3	266 N.M.I.	
40,000	-56.5	-57	-0	3	5	-57	-1	3	5	-54	3	4	5	4	4
30,000	-44.5	-47	-2	0	1	-45	-0	2	3	-35	9	11	12	3	3
20,000	-21.2	-22	-1	2	4	-18	3	6	7	-9	13	14	15	5	4
10,000	-4.6	-8	-4	-0	2	-3	1	5	6	7	11	13	14	6	5
DETROIT TO MIAMI															
53,000	-56.5	-67	-11	-8	-7	-64	-8	-6	-4	-67	-10	-8	-7	998 N.M.I.	
40,000	-56.5	-57	-1	2	3	-57	-1	2	3	-55	1	3	3	4	4
30,000	-44.5	-43	2	4	5	-41	3	5	6	-34	10	12	13	3	3
20,000	-21.2	-16	5	7	9	-14	7	9	11	-8	14	15	16	4	3
10,000	-4.6	-2	3	6	7	1	6	8	10	8	12	13	14	4	3
DETROIT TO MILWAUKEE															
53,000	-56.5	-60	-3	-0	1	-58	-1	1	3	-61	-4	-2	-0	206 N.M.I.	
40,000	-56.5	-56	1	5	7	-56	0	4	6	-54	3	5	6	6	6
30,000	-44.5	-49	-4	-2	-0	-46	-2	1	2	-36	8	10	12	4	3
20,000	-21.2	-25	-4	-0	1	-20	1	4	5	-10	12	14	15	5	4
10,000	-4.6	-11	-7	-3	-0	-5	-1	3	5	6	10	12	13	6	5
DETROIT TO MINNEAPOLIS															
53,000	-56.5	-59	-3	0	2	-57	-1	2	3	-60	-3	-1	0	457 N.M.I.	
40,000	-56.5	-55	1	5	7	-56	0	5	7	-54	3	5	6	6	6
30,000	-44.5	-49	-5	-2	-1	-47	-2	0	1	-37	8	10	11	4	3
20,000	-21.2	-26	-5	-2	0	-21	0	3	5	-10	11	13	15	5	5
10,000	-4.6	-12	-8	-3	-1	-6	-1	2	4	6	10	12	14	6	5
DETROIT TO NEW YORK															
53,000	-56.5	-60	-4	-1	1	-58	-2	1	2	-61	-5	-2	-1	441 N.M.I.	
40,000	-56.5	-56	0	4	6	-56	0	4	6	-54	3	5	6	6	6
30,000	-44.5	-47	-3	-0	1	-46	-1	1	2	-36	8	10	12	4	3
20,000	-21.2	-23	-2	1	3	-20	1	4	6	-10	12	13	14	5	4
10,000	-4.6	-10	-5	-1	1	-5	-1	3	5	5	10	12	13	6	5
DETROIT TO OMAHA															
53,000	-56.5	-60	-4	-1	1	-59	-2	1	2	-62	-6	-3	-2	608 N.M.I.	
40,000	-56.5	-56	0	4	6	-57	-1	3	5	-54	3	5	6	6	6
30,000	-44.5	-48	-4	-1	0	-46	-1	1	2	-36	9	11	12	3	3
20,000	-21.2	-25	-3	0	2	-19	2	5	6	-9	12	14	15	5	4
10,000	-4.6	-10	-5	-1	1	-4	1	4	6	7	12	14	15	6	5
DETROIT TO PHILADELPHIA															
53,000	-56.5	-60	-4	-1	0	-59	-2	1	2	-62	-5	-3	-2	393 N.M.I.	
40,000	-56.5	-57	-0	4	6	-57	-0	4	6	-54	3	5	6	5	6
30,000	-44.5	-47	-3	-0	1	-46	-1	1	3	-36	9	11	12	4	3
20,000	-21.2	-23	-2	2	4	-19	2	5	6	-9	12	14	15	5	4
10,000	-4.6	-10	-5	-1	1	-5	-0	3	5	6	10	12	13	6	5
DETROIT TO PITTSBURGH															
53,000	-56.5	-60	-4	-1	0	-58	-2	1	2	-62	-5	-3	-1	176 N.M.I.	
40,000	-56.5	-56	0	4	6	-57	-0	4	6	-54	3	5	6	5	6
30,000	-44.5	-47	-3	-1	1	-46	-1	1	2	-36	9	11	12	4	3
20,000	-21.2	-23	-2	1	3	-19	2	5	6	-9	12	14	15	5	4
10,000	-4.6	-10	-5	-1	1	-5	-0	3	5	6	10	12	13	6	5
DETROIT TO ROCHESTER, N.Y.															
53,000	-56.5	-59	-3	-0	2	-57	-1	2	3	-60	-4	-1	0	256 N.M.I.	
40,000	-56.5	-56	1	5	7	-56	1	5	7	-54	3	5	6	6	6
30,000	-44.5	-48	-4	-1	-0	-46	-2	0	2	-37	8	10	11	4	3
20,000	-21.2	-25	-4	-0	2	-21	0	3	5	-10	11	13	14	5	5
10,000	-4.6	-12	-7	-3	-1	-6	-2	2	4	5	9	11	12	6	5
DETROIT TO ST. LOUIS															
53,000	-56.5	-61	-5	-2	-0	-59	-3	-0	1	-63	-7	-4	-3	382 N.M.I.	
40,000	-56.5	-56	0	4	6	-57	-1	3	5	-54	3	5	6	5	5
30,000	-44.5	-47	-2	-0	1	-45	-1	2	3	-35	9	11	12	3	3
20,000	-21.2	-23	-2	1	3	-18	3	6	7	-9	13	14	15	5	4
10,000	-4.6	-9	-4	-0	2	-3	1	5	7	7	12	13	14	6	5
DETROIT TO ST. PETERSBURG															
53,000	-56.5	-66	-10	-7	-6	-64	-7	-5	-3	-66	-10	-8	-7	860 N.M.I.	
40,000	-56.5	-57	-1	2	3	-58	-1	2	3	-55	1	3	5	3	4
30,000	-44.5	-43	1	3	4	-42	3	5	6	-34	10	12	13	3	3
20,000	-21.2	-17	4	7	8	-15	6	9	10	-8	14	15	16	4	2
10,000	-4.6	-3	2	5	6	1	5	8	9	8	12	13	14	4	2
DETROIT TO SAN FRANCISCO															
53,000	-56.5	-61	-4	-1	0	-59	-2	0	2	-63	-6	-4	-3	1801 N.M.I.	
40,000	-56.5	-56	0	5	7	-58	-1	3	4	-54	2	4	5	6	5
30,000	-44.5	-48	-4	-1	-0	-46	-1	1	2	-36	9	10	11	3	3
20,000	-21.2	-24	-2	1	3	-19	2	5	6	-9	13	14	15	6	4
10,000	-4.6	-8	-4	0	3	-2	2	6	8	10	14	16	17	6	5
DETROIT TO TOLEDO															
53,000	-56.5	-60	-3	-1	1	-58	-2	1	2	-61	-5	-2	-1	44 N.M.I.	
40,000	-56.5	-56	0	4	6	-57	-0	4	6	-54	3	5	6	6	6
30,000	-44.5	-48	-3	-1	0	-46	-1	1	2	-36	8	11	12	4	3
20,000	-21.2	-24	-3	0	2	-20	1	4	6	-10	12	14	15	5	4
10,000	-4.6	-11	-6	-2	0	-5	-0	3	5	6	10	12	13	6	5
DETROIT TO WASHINGTON, D.C.															
53,000	-56.5	-61	-4	-2	-0	-59	-3	0	2	-62	-6	-3	-2	352 N.M.I.	
40,000	-56.5	-57	-0	3	5	-57	-0	3	5	-54	3	4	5	5	6
30,000	-44.5	-47	-2	0	1	-45	-1	2	3	-36	9	11	12	4	3
20,000	-21.2	-22	-1	2	4	-19	2	5	7	-9	12	14	15	5	4
10,000	-4.6	-9	-4	0	2	-4	0	4	6	6	11	12	13	6	5

\*D-DIFFERENCE BETWEEN INDICATED PER CENT RELIABILITY TEMPERATURE AND INTERNATIONAL STANDARD ATMOSPHERE TEMPERATURE.













































































ENROUTE TEMPERATURES AND STANDARD DEVIATION IN DEGREES CELSIUS FOR GREAT CIRCLE AIR ROUTES

HEIGHT IN FEET	ISA TEMP.	ENROUTE TEMPERATURE																				STANDARD DEVIATION						
		JANUARY				APRIL				JULY				OCTOBER				ANNUAL				JAN	APR	JUL	OCT			
		50	D50	D75	D85	50	D50	D75	D85	50	D50	D75	D85	50	D50	D75	D85	50	D50	D75	D85							
WATSON LAKE TO WHITEHORSE																												
53,000	-56.5	-53	4	8	10	-49	7	10	11	-48	9	11	12	-52	5	7	8	-50	6	9	10	6	4	189 N.MI.				
40,000	-54.5	-54	5	7	10	-51	5	9	11	-50	6	10	11	-52	4	7	9	-52	5	8	10	7	5		3	4		
30,000	-44.5	-53	-8	-6	-4	-51	-7	-4	-3	-44	0	3	4	-49	-4	-2	-0	-49	-5	-2	0	4	4		3	4		
20,000	-21.2	-33	-12	-7	-4	-29	-8	-4	-3	-17	4	6	8	-26	-4	-1	1	-26	-5	-1	1	7	5		3	6		
10,000	-4.6	-19	-14	-9	-7	-13	-9	-6	-5	-2	3	5	6	-10	-5	-2	-1	-11	-6	-2	-0	7	4		3	4		
WINDSOR TO WINNIPEG																												
53,000	-56.5	-57	-0	3	5	-54	2	5	6	-55	2	4	6	-58	-1	1	3	-56	1	3	5	5	4		4	4		
40,000	-56.5	-54	2	7	9	-54	2	6	8	-53	4	7	8	-54	2	6	8	-54	3	6	8	6	6		4	5		
30,000	-44.5	-52	-8	-5	-4	-49	-4	-2	-1	-39	6	8	10	-45	-0	2	4	-46	-2	2	4	4	4		4	4		
20,000	-21.2	-32	-10	-6	-4	-25	-3	0	2	-13	9	11	12	-20	1	5	7	-22	-1	4	6	6	5		4	5		
10,000	-4.6	-19	-14	-9	-7	-9	-5	-1	1	2	7	10	11	-4	1	5	7	-7	-3	2	5	7	6		4	6		

\*D--DIFFERENCE BETWEEN INDICATED PER CENT RELIABILITY TEMPERATURE AND INTERNATIONAL STANDARD ATMOSPHERE TEMPERATURE.

**TABLE 6**

**ROUTE TEMPERATURES AT THE 5,000-  
10,000- AND 15,000-FOOT LEVELS**







































## ENROUTE TEMPERATURES AND STANDARD DEVIATION IN DEGREES CELSIUS FOR GREAT CIRCLE AIR ROUTES

HEIGHT IN FEET	ISA TEMP.	ENROUTE TEMPERATURE												STANDARD DEVIATION									
		JANUARY 50 050 D75 D85				APRIL 50 050 D75 D85				JULY 50 050 D75 D85				OCTOBER 50 050 D75 D85				ANNUAL 50 050 D75 D85				JAN	APR
CORPUS CHRISTI TO SAN ANTONIO																							
15,000	-14.7	-7	8	10	11	-4	10	12	14	1	15	16	17	-2	13	15	15	3	3	1	2		
10,000	-4.6	3	8	10	11	7	12	14	15	11	15	16	17	9	13	15	16	3	3	1	2		
5,000	5.1	10	5	9	11	16	11	13	15	21	16	17	18	16	11	13	14	5	4	2	3		
DALLAS TO FT. WORTH																							
15,000	-14.7	-10	4	7	9	-6	8	11	12	0	15	16	17	-3	11	13	14	4	4	2	3		
10,000	-4.6	-1	4	7	8	5	9	12	13	10	15	16	17	7	12	14	15	4	4	2	3		
5,000	5.1	7	1	6	8	13	8	12	13	21	16	18	19	15	10	12	14	6	5	3	4		
DALLAS TO HOUSTON																							
15,000	-14.7	-9	6	8	10	-6	9	11	13	0	15	16	17	-3	12	14	15	4	3	1	3		
10,000	-4.6	1	6	8	10	6	10	13	14	10	15	16	16	8	12	14	15	4	4	1	3		
5,000	5.1	8	3	7	9	14	9	12	13	21	16	17	18	15	10	12	13	6	4	2	3		
DALLAS TO JACKSON																							
15,000	-14.7	-10	5	8	9	-6	8	11	12	-0	15	16	16	-3	12	13	14	4	3	2	3		
10,000	-4.6	-0	4	7	8	4	9	11	13	10	14	15	16	7	12	14	15	4	4	2	3		
5,000	5.1	7	2	5	7	12	7	10	12	20	15	17	18	14	9	12	13	6	5	3	4		
DALLAS TO KANSAS CITY																							
15,000	-14.7	-13	2	5	6	-9	6	9	10	-0	14	15	16	-5	10	12	14	5	4	2	4		
10,000	-4.6	-4	1	4	6	2	7	10	11	10	14	16	17	5	10	13	14	5	4	2	4		
5,000	5.1	3	-2	3	6	11	5	9	12	21	16	18	19	13	8	12	13	7	6	4	5		
DALLAS TO LANTON																							
15,000	-14.7	-11	4	6	8	-7	8	10	12	0	15	16	17	-4	11	13	14	4	4	2	3		
10,000	-4.6	-2	3	6	8	4	9	12	13	11	15	16	17	7	11	14	15	5	4	2	3		
5,000	5.1	6	1	5	8	13	8	11	13	22	17	19	20	15	10	13	14	7	5	4	4		
DALLAS TO LITTLE ROCK																							
15,000	-14.7	-11	4	7	8	-7	8	10	11	-0	14	16	16	-4	11	13	14	4	4	2	3		
10,000	-4.6	-2	3	6	7	4	8	11	13	10	15	16	16	7	11	13	15	4	4	2	3		
5,000	5.1	6	0	5	7	12	7	10	12	21	16	18	19	14	9	12	13	6	5	3	4		
DALLAS TO LUBBOCK																							
15,000	-14.7	-11	4	7	8	-7	8	10	12	0	15	16	17	-3	11	13	14	4	4	2	3		
10,000	-4.6	-1	3	6	8	5	9	12	14	11	16	17	17	7	11	14	15	5	4	2	3		
5,000	5.1	6	1	6	8	14	9	12	14	22	17	20	21	15	10	13	15	7	5	4	4		
DALLAS TO MCALISTER																							
15,000	-14.7	-11	4	6	8	-7	8	10	11	-0	15	16	16	-4	11	13	14	4	4	2	3		
10,000	-4.6	-2	3	6	7	4	9	11	13	10	15	16	17	7	11	13	15	4	4	2	3		
5,000	5.1	6	1	5	7	12	7	11	13	21	16	19	20	14	9	12	14	7	5	3	4		
DALLAS TO MEMPHIS																							
15,000	-14.7	-11	4	7	8	-7	7	10	11	-0	14	15	16	-4	11	13	14	4	4	2	3		
10,000	-4.6	-2	3	6	7	5	8	11	12	10	14	15	16	6	11	13	15	4	4	2	3		
5,000	5.1	5	0	4	7	11	6	10	12	20	15	17	18	14	8	11	13	6	5	3	4		
DALLAS TO MIDLAND																							
15,000	-14.7	-10	5	7	9	-6	8	11	12	1	15	16	17	-3	12	14	15	4	4	2	3		
10,000	-4.6	-0	4	7	9	5	10	13	14	11	16	17	17	7	12	14	15	4	4	2	3		
5,000	5.1	7	2	6	9	14	9	13	14	22	17	19	20	16	11	13	15	7	5	3	4		
DALLAS TO MONROE																							
15,000	-14.7	-10	5	7	9	-6	8	11	12	-0	15	16	16	-3	11	13	14	4	3	2	3		
10,000	-4.6	-0	4	7	8	4	9	12	13	10	15	16	16	7	12	14	15	4	4	2	3		
5,000	5.1	7	1	5	8	13	7	11	12	20	15	17	18	14	9	12	13	6	5	3	4		
DALLAS TO NEW ORLEANS																							
15,000	-14.7	-9	6	8	10	-6	9	11	12	0	15	16	16	-3	12	14	15	3	3	1	3		
10,000	-4.6	1	6	8	9	5	10	12	13	10	15	16	16	7	12	14	15	4	4	1	3		
5,000	5.1	8	3	6	8	13	8	11	12	20	15	16	17	14	9	12	13	5	4	2	4		
DALLAS TO OKLAHOMA CITY																							
15,000	-14.7	-11	3	6	8	-7	8	10	11	0	15	16	16	-4	11	13	14	4	4	2	3		
10,000	-4.6	-2	2	6	7	4	9	11	13	10	15	16	17	6	11	13	15	5	4	2	4		
5,000	5.1	5	0	5	7	12	7	11	13	22	17	19	20	15	9	13	14	7	6	4	5		
DALLAS TO SAN ANTONIO																							
15,000	-14.7	-9	6	8	10	-6	9	11	13	0	15	16	17	-3	12	14	15	4	3	1	3		
10,000	-4.6	1	5	8	10	6	10	13	14	11	15	16	17	8	12	14	15	4	4	2	3		
5,000	5.1	8	3	7	9	14	9	12	14	21	16	18	19	15	10	13	14	6	5	3	3		
DALLAS TO SHREVEPORT																							
15,000	-14.7	-10	5	7	9	-6	8	11	12	0	15	16	16	-3	12	13	14	4	3	2	3		
10,000	-4.6	-0	4	7	8	5	9	12	13	10	15	16	16	7	12	14	15	4	4	2	3		
5,000	5.1	7	2	6	8	13	8	11	13	21	16	18	19	14	9	12	13	6	5	3	4		
DALLAS TO TULSA																							
15,000	-14.7	-12	3	6	7	-7	7	10	11	-0	15	16	16	-4	11	13	14	4	4	2	3		
10,000	-4.6	-2	2	5	7	3	8	11	12	10	15	16	17	6	11	13	15	5	4	2	4		
5,000	5.1	5	-0	4	7	12	7	11	13	21	16	19	20	14	9	12	14	7	6	4	5		
DALLAS TO WACO																							
15,000	-14.7	-10	5	8	9	-6	9	11	12	0	15	16	17	-3	12	14	15	4	3	2	3		
10,000	-4.6	-0	4	7	9	5	10	12	14	10	15	16	17	7	12	14	15	4	4	2	3		
5,000	5.1	7	2	6	8	14	8	12	14	21	16	18	19	15	10	12	14	6	5	3	4		
DALLAS TO WICHITA FALLS																							
15,000	-14.7	-11	4	7	8	-7	8	10	12	0	15	16	17	-4	11	13	14	4	4	2	3		
10,000	-4.6	-1	3	6	8	4	9	12	13	11	15	16	17	7	11	14	15	5	4	2	3		
5,000	5.1	6	1	6	8	13	8	12	14	22	17	19	20	15	10	13	14	7	5	3	4		

## ENROUTE TEMPERATURES AND STANDARD DEVIATION IN DEGREES CELSIUS FOR GREAT CIRCLE AIR ROUTES

HEIGHT IN FEET	ISA TEMP.	ENROUTE TEMPERATURE																				STANDARD DEVIATION			
		JANUARY				APRIL				JULY				OCTOBER				ANNUAL				JAN	APR	JUL	OCT
		50	D50	D75	D85	50	D50	D75	D85	50	D50	D75	D85	50	D50	D75	D85	50	D50	D75	D85				
DANVILLE TO GREENSBORO																									
15,000	-14.7	-12	3	6	7	-10	5	8	9	-2	13	14	15	-6	9	11	13	-7	7	10	11	4	4	41 N.MI.	3
10,000	-4.6	-4	1	4	6	-0	4	7	9	7	12	13	14	4	8	11	12	2	6	9	10	5	4	2	4
5,000	5.1	3	-2	2	5	8	3	6	8	17	12	14	14	11	6	9	10	10	5	8	10	6	5	3	4
DANVILLE TO RICHMOND																									
15,000	-14.7	-13	2	5	7	-10	4	7	8	-2	12	14	14	-6	9	11	12	-8	7	9	11	5	4	112 N.MI.	4
10,000	-4.6	-4	0	3	5	-1	3	6	8	7	11	13	14	3	8	11	12	1	6	8	10	5	4	2	4
5,000	5.1	2	-3	2	4	7	2	6	7	17	11	13	14	10	5	8	10	9	4	7	9	6	5	3	5
DAYTON TO FT. WAYNE																									
15,000	-14.7	-17	-2	2	4	-13	2	5	7	-3	12	14	15	-8	7	10	11	-10	5	8	10	5	5	79 N.MI.	4
10,000	-4.6	-9	-4	-0	2	-3	1	5	6	7	11	13	14	2	7	10	12	-1	4	7	9	6	5	3	5
5,000	5.1	-3	-8	-3	0	5	-0	4	6	17	11	14	15	9	4	8	10	7	2	6	8	8	6	3	6
DAYTON TO INDIANAPOLIS																									
15,000	-14.7	-16	-1	2	4	-12	3	6	7	-2	12	14	15	-7	7	10	12	-9	5	8	10	5	4	96 N.MI.	4
10,000	-4.6	-8	-3	0	3	-3	2	5	7	7	12	13	14	3	7	10	12	-0	4	8	9	6	5	2	5
5,000	5.1	-2	-7	-2	1	5	0	4	7	17	12	14	15	9	4	8	10	7	2	7	9	8	6	3	6
DAYTON TO PITTSBURGH																									
15,000	-14.7	-16	-2	2	4	-13	2	5	7	-3	12	14	14	-8	7	10	11	-10	5	8	10	5	5	187 N.MI.	4
10,000	-4.6	-8	-4	0	2	-4	1	4	6	6	11	13	14	2	7	10	11	-1	4	7	9	6	5	2	5
5,000	5.1	-2	-7	-2	1	5	-0	4	6	16	11	13	14	9	3	7	10	7	2	6	8	8	6	3	6
DAYTON TO ST. LOUIS																									
15,000	-14.7	-15	-1	3	5	-11	3	6	8	-2	13	14	15	-7	8	11	12	-9	6	9	10	5	4	294 N.MI.	4
10,000	-4.6	-7	-3	1	3	-2	3	6	8	8	12	14	15	3	8	11	12	0	5	8	10	5	5	2	4
5,000	5.1	-1	-7	-2	1	6	1	5	7	17	12	15	16	10	5	8	11	8	3	7	9	8	6	3	6
DAYTON TO WASHINGTON, D.C.																									
15,000	-14.7	-15	-1	3	5	-12	3	6	7	-3	12	14	14	-7	7	10	12	-9	5	8	10	5	4	339 N.MI.	4
10,000	-4.6	-7	-3	1	3	-3	2	5	7	7	11	13	14	2	7	10	12	-0	4	7	9	5	5	2	4
5,000	5.1	-1	-6	-1	2	5	0	4	6	16	11	13	14	9	4	8	10	7	2	6	8	8	6	3	6
DAYTONA BEACH TO JACKSONVILLE																									
15,000	-14.7	-6	9	10	12	-5	10	11	12	-1	14	15	15	-2	13	14	15	-4	11	13	14	3	3	80 N.MI.	2
10,000	-4.6	3	7	10	11	4	9	11	12	8	13	14	14	7	12	14	14	6	10	12	13	3	3	1	2
5,000	5.1	10	4	7	8	12	7	9	10	18	12	13	14	14	9	11	12	13	8	10	11	4	3	2	3
DAYTONA BEACH TO LAKELAND																									
15,000	-14.7	-5	9	11	12	-5	10	12	13	-1	14	15	15	-2	13	15	15	-3	12	13	14	3	3	87 N.MI.	2
10,000	-4.6	4	8	10	11	5	9	11	12	8	13	14	14	8	12	14	15	6	11	12	13	3	3	1	2
5,000	5.1	10	5	7	9	13	8	10	11	17	12	13	14	14	9	11	12	14	9	10	11	3	3	1	3
DAYTONA BEACH TO MELBOURNE																									
15,000	-14.7	-5	9	11	12	-5	10	12	13	-1	14	15	15	-2	13	15	15	-3	12	13	14	3	3	69 N.MI.	2
10,000	-4.6	4	8	10	11	5	9	11	12	8	13	14	14	8	12	14	15	6	11	12	13	3	3	1	2
5,000	5.1	10	5	7	9	13	8	10	11	17	12	13	14	14	9	11	12	14	9	10	11	3	3	1	2
DAYTONA BEACH TO MIAMI																									
15,000	-14.7	-5	10	12	13	-4	11	12	13	-1	14	15	15	-1	14	15	16	-3	12	13	14	3	3	207 N.MI.	2
10,000	-4.6	4	9	11	12	5	10	12	13	8	13	14	14	8	13	14	15	7	11	12	13	3	3	1	2
5,000	5.1	11	6	8	9	13	8	10	11	17	12	13	14	15	10	11	12	14	9	11	11	3	3	1	2
DAYTONA BEACH TO ORLANDO																									
15,000	-14.7	-6	9	11	12	-5	10	12	13	-1	14	15	15	-2	13	15	15	-3	12	13	14	3	3	41 N.MI.	2
10,000	-4.6	4	8	10	11	5	9	11	12	8	13	14	14	8	12	14	15	6	11	12	13	3	3	1	2
5,000	5.1	10	5	7	9	13	8	10	11	17	12	13	14	14	9	11	12	14	8	10	11	4	3	1	3
DAYTONA BEACH TO TAMPA																									
15,000	-14.7	-5	9	11	12	-5	10	12	13	-1	14	15	15	-2	13	15	15	-3	12	13	14	3	3	107 N.MI.	2
10,000	-4.6	4	8	10	11	5	9	11	12	8	13	14	14	8	12	14	15	6	11	12	13	3	3	1	2
5,000	5.1	10	5	7	9	13	8	10	11	18	12	13	14	14	9	11	12	14	9	10	11	3	3	1	3
DAYTONA BEACH TO WEST PALM BEACH																									
15,000	-14.7	-5	10	12	12	-4	10	12	13	-1	14	15	15	-1	13	15	16	-3	12	13	14	3	3	158 N.MI.	2
10,000	-4.6	4	9	10	11	5	10	11	12	8	13	14	14	8	12	14	15	6	11	12	13	3	3	1	2
5,000	5.1	11	6	8	9	13	8	10	11	17	12	13	14	14	9	11	12	14	9	10	11	3	3	1	2
DENVER TO GRAND JUNCTION																									
15,000	-14.7	-17	-2	2	4	-11	3	6	8	0	15	17	17	-7	8	11	12	-9	6	10	11	6	4	174 N.MI.	4
10,000	-4.6	-7	-2	2	4	0	5	8	10	13	18	19	20	3	8	11	13	2	7	11	13	6	5	3	5
5,000	5.1	1	-4	0	2	12	7	11	13	26	21	24	25	14	9	14	16	13	8	14	16	6	6	4	6
DENVER TO LINCOLN																									
15,000	-14.7	-18	-3	1	3	-12	3	6	8	-1	14	16	16	-7	8	10	12	-9	5	9	11	6	4	377 N.MI.	4
10,000	-4.6	-8	-3	1	3	-1	4	7	9	11	15	17	18	3	8	11	13	1	6	10	12	6	5	3	5
5,000	5.1	-1	-6	-1	2	9	4	8	11	22	17	20	22	12	7	11	14	11	5	11	14	8	7	4	7
DENVER TO LUBBOCK																									
15,000	-14.7	-14	0	4	6	-9	6	8	10	0	15	16	17	-5	9	12	13	-7	8	11	13	5	4	395 N.MI.	4
10,000	-4.6	-4	0	4	6	2	7	10	12	12	17	18	19	5	10	12	14	4	8	12	13	5	5	2	4
5,000	5.1	3	-2	3	5	13	8	12	14	24	19	22	23	15	10	14	16	14	9	14	16	7	6	4	5
DENVER TO OMAHA																									
15,000	-14.7	-18	-3	1	3	-12	3	6	8	-1	14	16	16	-7	8	10	12	-9	5	9	11	6	4	377 N.MI.	4
10,000	-4.6	-8	-3	1	3	-1	4	7	9	11	15	17	18	3	8	11	13	1	6	10	12	6	5	3	5
5,000	5.1	-1	-6	-1	2	9	4	8	11	22	17	20	22	12	7	11	14	11	5	11	14	8	7	4	7
DENVER TO RAPID CITY																									
15,000	-14.7	-19	-4	-0	2	-13	2	5	7	-1	14	15	16	-8	6	10	11	-10	4	8	10	6	5	3	5
10,000	-4.6	-9	-5	-0	2	-2	3	6	8	11	15	17	18	2	7	10	12	0	5	9	12	6	5	3	5
5,000	5.1	-2	-7	-3	-0	9	3	8	10	23	18	21	23	12	7	11	14	10	5	11	14	7	7	4	5

## ENROUTE TEMPERATURES AND STANDARD DEVIATION IN DEGREES CELSIUS FOR GREAT CIRCLE AIR ROUTES

\*D--DIFFERENCE BETWEEN INDICATED PER CENT RELIABILITY TEMPERATURE AND INTERNATIONAL STANDARD ATMOSPHERE TEMPERATURE.

## ENROUTE TEMPERATURES AND STANDARD DEVIATION IN DEGREES CELSIUS FOR GREAT CIRCLE AIR ROUTES

SLIGHT IN FEET	ISA TEMP.	ENROUTE								TEMPERATURE								STANDARD DEVIATION									
		JANUARY				APRIL				JULY				OCTOBER				ANNUAL				JAN	APR	JUL	OCT		
		50	D50	D75	D85	50	D50	D75	D85	50	D50	D75	D85	50	D50	D75	D85	50	D50	D75	D85						
DETROIT TO WASHINGTON, D.C.																											
15,000	-14.7	-17	-2	2	4	-13	2	5	6	-3	11	13	14	-8	7	10	11	-10	4	8	9	6	5	3	4	352 N.MI.	
10,000	-4.6	-9	-4	0	2	-4	0	4	6	-6	11	12	13	2	6	9	11	-1	3	7	8	6	5	3	4		
5,000	5.1	-3	-8	-3	0	-4	-1	3	5	16	11	13	14	8	3	7	9	6	1	5	8	8	6	3	6		
DOTHAN TO MONTGOMERY																											
15,000	-14.7	-8	6	9	10	-6	9	11	12	-1	14	15	16	-3	12	14	15	-5	10	12	13	3	3	2	3	80 N.MI.	
10,000	-4.6	1	6	8	9	-4	8	11	12	-9	13	14	15	7	12	13	14	5	10	11	12	3	3	1	3		
5,000	5.1	8	2	6	7	12	6	9	10	18	13	14	15	13	8	10	12	13	8	10	11	5	4	2	3		
EDMONTON TO GRAND PRAIRIE																											
15,000	-14.7	-27	-13	-7	-5	-20	-5	-2	-0	-9	5	8	9	-17	-2	2	4	-18	-4	1	3	8	5	3	5	217 N.MI.	
10,000	-4.6	-18	-14	-8	-5	-10	-5	-2	-0	-1	5	8	9	-7	-2	1	3	-9	-4	0	3	8	5	4	5		
5,000	5.1	-10	-15	-10	-7	-3	-8	-5	-3	11	6	9	11	2	-3	1	3	-0	-5	0	3	8	5	4	6		
EDMONTON TO REGINA																											
15,000	-14.7	-28	-14	-9	-6	-19	-4	-0	1	-8	7	9	11	-15	-1	3	5	-17	-3	2	4	8	5	3	6	372 N.MI.	
10,000	-4.6	-18	-13	-8	-5	-9	-4	-1	1	-3	8	10	11	-6	-1	3	5	-7	-3	2	4	8	5	4	6		
5,000	5.1	-10	-16	-12	-10	-1	-6	-1	1	14	8	12	13	4	-1	4	7	2	-3	2	5	6	7	5	7		
EDMONTON TO SASKATOON																											
15,000	-14.7	-29	-14	-9	-6	-19	-4	-1	1	-8	6	9	10	-16	-1	3	5	-18	-3	1	4	8	5	3	6	260 N.MI.	
10,000	-4.6	-18	-14	-8	-5	-9	-5	-1	1	2	7	10	11	-6	-2	2	4	-8	-3	1	4	8	5	4	6		
5,000	5.1	-11	-16	-12	-10	-1	-6	-2	0	13	8	11	12	4	-1	3	6	1	-4	1	4	6	7	5	7		
ELKO TO ELY																											
15,000	-14.7	-16	-1	3	5	-12	2	5	7	-0	14	16	17	-8	7	10	12	-9	6	9	11	6	4	2	5	102 N.MI.	
10,000	-4.6	-6	-2	2	5	-1	3	7	8	12	17	19	20	3	7	11	12	2	6	10	13	6	5	3	5		
5,000	5.1	1	-4	-0	2	11	6	9	11	25	20	22	24	14	9	12	14	13	8	13	15	5	5	4	6		
ELKO TO RENO																											
15,000	-14.7	-15	-1	3	6	-13	2	5	7	-1	14	15	16	-8	7	10	12	-9	5	9	11	6	4	2	5	199 N.MI.	
10,000	-4.6	-6	-1	3	5	-2	2	6	8	11	16	18	19	2	7	10	12	1	6	10	12	6	5	3	5		
5,000	5.1	2	-4	0	2	10	5	8	10	23	18	21	22	13	8	12	13	12	7	12	14	5	5	4	5		
ELMIRA TO ROCHESTER, N.Y.																											
15,000	-14.7	-19	-5	-0	2	-16	-1	2	4	-5	10	12	13	-10	5	8	10	-12	2	6	8	6	5	3	5	67 N.MI.	
10,000	-4.6	-12	-7	-3	-1	-7	-2	1	3	5	9	11	12	-0	5	8	10	-3	1	5	7	6	5	3	5		
5,000	5.1	-6	-11	-6	-3	2	-3	1	3	14	9	11	13	7	2	6	8	4	-1	4	6	7	6	3	6		
ELMIRA TO WILLIAMSPORT																											
15,000	-14.7	-18	-3	1	3	-15	0	3	5	-4	11	13	14	-9	6	9	11	-11	3	7	9	6	5	3	5	55 N.MI.	
10,000	-4.6	-10	-6	-2	1	-6	-1	2	4	5	10	12	13	1	5	9	10	-3	2	6	8	6	5	3	5		
5,000	5.1	-4	-9	-4	-2	3	-2	2	4	15	10	12	13	7	2	6	8	5	0	4	7	7	6	3	6		
EL PASO TO MIDLAND																											
15,000	-14.7	-9	6	9	10	-6	8	11	12	1	16	17	17	-3	12	14	15	-4	10	13	14	4	4	2	3	213 N.MI.	
10,000	-4.6	0	5	8	10	5	10	13	14	12	17	18	18	7	12	14	15	6	11	13	15	5	4	2	3		
5,000	5.1	8	3	7	9	16	11	14	16	24	19	21	22	18	12	15	16	16	11	15	17	6	5	3	4		
EL PASO TO PHOENIX																											
15,000	-14.7	-9	5	9	11	-7	7	10	11	1	16	17	18	-4	11	13	14	-5	10	12	14	5	4	2	3	301 N.MI.	
10,000	-4.6	-0	4	8	10	5	9	12	13	13	18	19	20	7	11	14	15	6	11	14	15	5	4	2	3		
5,000	5.1	8	2	6	8	17	12	15	17	26	21	23	24	19	14	17	18	17	12	16	18	6	5	3	4		
EL PASO TO ROSWELL																											
15,000	-14.7	-10	5	8	10	-7	8	10	12	1	16	17	17	-3	11	13	14	-5	10	12	14	5	4	2	3	134 N.MI.	
10,000	-4.6	-0	4	7	9	5	10	12	14	13	17	18	19	7	12	14	15	6	11	13	15	5	4	2	3		
5,000	5.1	7	2	6	9	16	11	14	16	25	20	22	23	18	13	16	17	16	11	15	17	6	5	3	4		
EL PASO TO TUCSON																											
15,000	-14.7	-9	6	9	11	-7	8	10	12	1	16	17	18	-3	11	13	14	-4	10	13	14	5	4	2	3	233 N.MI.	
10,000	-4.6	0	5	8	10	5	10	12	14	13	18	19	20	7	12	14	15	6	11	14	15	5	4	2	3		
5,000	5.1	8	3	7	9	17	12	15	17	25	20	22	23	19	14	17	18	17	12	16	18	6	5	3	4		
ELY TO SALT LAKE CITY																											
15,000	-14.7	-17	-2	2	5	-12	2	5	7	0	15	16	17	-7	7	10	12	-9	6	9	11	6	4	2	4	160 N.MI.	
10,000	-4.6	-7	-2	2	4	-1	4	7	9	13	17	19	20	3	7	11	13	2	7	11	13	6	5	3	5		
5,000	5.1	1	-4	-1	1	11	6	10	12	26	21	24	25	14	9	13	15	13	8	13	16	5	5	4	6		
EUGENE TO MEDFORD																											
15,000	-14.7	-17	-2	2	4	-15	0	3	5	-4	11	13	14	-10	5	8	10	-11	3	7	9	6	5	3	5	106 N.MI.	
10,000	-4.6	-8	-3	1	3	-5	-0	3	5	7	11	14	15	-0	4	8	10	-2	3	7	9	6	5	3	5		
5,000	5.1	-0	-5	-2	-0	6	1	4	6	18	12	15	17	9	4	7	9	8	3	8	10	5	5	4	5		
EUGENE TO SALEM																											
15,000	-14.7	-18	-3	1	3	-15	-1	3	4	-5	10	12	13	-11	4	7	9	-12	2	6	8	6	5	3	5	48 N.MI.	
10,000	-4.6	-9	-4	0	2	-6	-1	2	4	6	10	13	14	-1	4	7	9	-2	2	6	8	6	5	3	5		
5,000	5.1	-1	-6	-3	-1	5	-0	3	5	17	12	15	16	8	3	6	8	7	2	7	9	5	5	4	5		
EVANSVILLE TO INDIANAPOLIS																											
15,000	-14.7	-15	-0	3	5	-11	4	6	8	-2	13	14	15	-7	8	11	12	-9	6	9	11	5	4	2	4	117 N.MI.	
10,000	-4.6	-7	-2	1	3	-2	3	6	8	8	12	14	15	3	8	11	12	1	5	8	10	5	5	2	4		
5,000	5.1	-1	-6	-1	2	6	1	5	7	18	12	15	16	10	5	9	11	8	3	7	9	7	6	3	6		
EVANSVILLE TO LOUISVILLE																											
15,000	-14.7	-14	1	4	6	-11	4	7	8	-2	13	14	15	-6	9	11	12	-8	7	9	11	5	4	2	4	85 N.MI.	
10,000	-4.6	-6	-1	2	4	-1	3	7	8	8	12	14	15	4	8	11	13	1	6	9	10	5	5	2	4		
5,000	5.1	0	-5	-0	2	7	2	6	8	18	13	15	16	10	5	9	11	9	4	8	10	7	6	3	5		
EVANSVILLE TO NASHVILLE																											
15,000	-14.7	-13	2	5	6	-10	5	8	9	-2	13	14	15	-6	9	12	13	-7	7	10	11	5	4	2	4	122 N.MI.	
10,000	-4.6	-5	-0	3	5	-0	4	8	9	8	13	14	15	4	9	12	13	2	6	9	11	5	5	2	4		
5,000	5.1	2	-4	1	3	8	3	6	8	18	13	15	16	11	6	9	11	10	4	8	10	7	5	3	4		

\*1)--DIFFERENCE BETWEEN INDICATED PER CENT RELIABILITY TEMPERATURE AND INTERNATIONAL STANDARD ATMOSPHERE TEMPERATURE.

## ENROUTE TEMPERATURES AND STANDARD DEVIATION IN DEGREES CELSIUS FOR GREAT CIRCLE AIR ROUTES

HEIGHT IN FEET	ISA TEMP.	ENROUTE TEMPERATURE												STANDARD DEVIATION			
		JANUARY			APRIL			JULY			OCTOBER			ANNUAL			JAN APR JUL OCT
		50 D50 D75 D85			50 D50 D75 D85			50 D50 D75 D85			50 D50 D75 D85			50 D50 D75 D85			
EVANSVILLE TO OWENSBORO																	
15,000	-14.7	-14	1	4	6	-10	4	7	9	-2	13	14	15	-6	7	9	11
10,000	-4.6	-6	-1	2	4	-1	4	7	9	8	12	14	15	4	8	11	13
5,000	5.1	0	-5	0	3	7	2	6	8	18	13	15	16	10	5	9	11
EVANSVILLE TO PADUCAH																	
15,000	-14.7	-14	1	4	6	-10	5	7	9	-2	13	14	15	-6	9	11	13
10,000	-4.6	-5	-1	3	4	-0	4	7	9	8	13	14	15	4	9	12	13
5,000	5.1	1	-4	0	3	7	2	6	8	18	13	15	16	11	6	9	11
EVANSVILLE TO ST. LOUIS																	
15,000	-14.7	-14	0	4	5	-11	4	7	8	-2	13	14	15	-6	9	11	13
10,000	-4.6	-6	-2	2	4	-1	4	7	9	8	13	14	15	4	8	11	13
5,000	5.1	-0	-5	-1	2	7	2	6	8	18	13	15	16	10	5	9	11
FARGO TO GRAND FORKS																	
15,000	-14.7	-25	-10	-6	-3	-17	-2	1	3	-5	9	12	13	-13	2	6	8
10,000	-4.6	-16	-12	-7	-4	-7	-3	1	3	5	9	12	14	-2	2	6	8
5,000	5.1	-10	-15	-9	-6	1	-4	1	3	16	11	14	15	6	1	6	8
FARGO TO JAMESTOWN																	
15,000	-14.7	-24	-10	-5	-3	-17	-2	2	4	-5	10	12	13	-12	3	6	8
10,000	-4.6	-15	-11	-6	-3	-7	-2	2	4	6	10	13	14	-2	3	7	9
5,000	5.1	-9	-14	-8	-5	2	-3	1	4	16	11	15	16	6	1	6	9
FARGO TO MINNEAPOLIS																	
15,000	-14.7	-23	-9	-4	-2	-16	-2	2	4	-5	10	12	14	-11	3	7	9
10,000	-4.6	-14	-10	-5	-3	-7	-2	2	4	6	10	13	14	-1	3	7	9
5,000	5.1	-9	-14	-8	-5	2	-3	2	4	16	11	14	16	7	1	6	9
FARGO TO WINNIPEG																	
15,000	-14.7	-26	-12	-7	-4	-18	-3	1	3	-6	9	11	12	-13	1	5	7
10,000	-4.6	-18	-13	-8	-5	-8	-3	1	3	-4	9	11	13	-3	1	5	8
5,000	5.1	-11	-16	-10	-7	0	-5	-0	2	15	10	13	15	5	0	5	7
FLINT TO GRAND RAPIDS																	
15,000	-14.7	-20	-5	-1	1	-15	-0	3	5	-4	10	12	14	-10	5	8	10
10,000	-4.6	-12	-7	-3	-1	-6	-1	2	4	5	10	12	13	0	5	8	10
5,000	5.1	-6	-11	-6	-3	2	-3	2	4	15	10	13	14	7	2	6	8
FLINT TO SAGINAW																	
15,000	-14.7	-20	-5	-1	1	-16	-1	2	4	-5	10	12	13	-10	5	8	10
10,000	-4.6	-12	-8	-3	-1	-6	-2	2	4	5	10	12	13	-0	5	8	10
5,000	5.1	-7	-12	-7	-4	2	-3	1	3	15	10	12	14	7	2	6	8
FLORENCE TO RALEIGH																	
15,000	-14.7	-10	4	7	8	-9	6	8	10	-2	13	14	15	-5	10	12	13
10,000	-4.6	-2	3	5	7	1	5	8	9	7	12	13	14	5	9	11	13
5,000	5.1	5	-0	4	6	9	4	7	9	17	12	14	14	12	6	9	11
FT. LAUDERDALE TO MIAMI																	
15,000	-14.7	-4	11	13	13	-3	11	13	14	-1	14	15	15	-2	13	14	15
10,000	-4.6	5	10	12	12	6	10	12	13	9	13	14	14	8	13	14	15
5,000	5.1	12	7	9	10	14	9	10	11	17	12	13	13	15	10	11	12
FT. LAUDERDALE TO WEST PALM BEACH																	
15,000	-14.7	-4	11	12	13	-4	11	13	14	-1	14	15	15	-2	12	14	15
10,000	-4.6	5	10	11	12	6	10	12	13	9	13	14	14	8	13	14	15
5,000	5.1	12	6	8	10	14	8	10	11	17	12	13	13	15	10	11	12
FT. MYERS TO SARASOTA																	
15,000	-14.7	-5	10	12	13	-4	11	13	14	-1	14	15	15	-3	12	13	14
10,000	-4.6	5	9	11	12	6	10	12	13	9	13	14	14	8	13	14	15
5,000	5.1	11	6	8	9	14	8	10	11	17	12	13	14	15	10	11	12
FT. MYERS TO WEST PALM BEACH																	
15,000	-14.7	-4	10	12	13	-4	11	13	14	-1	14	15	15	-2	12	13	14
10,000	-4.6	5	10	11	12	6	10	12	13	9	13	14	14	8	13	14	15
5,000	5.1	11	6	8	9	14	8	10	11	17	12	13	13	15	10	11	12
FT. NELSON TO FT. ST. JOHN																	
15,000	-14.7	-28	-13	-8	-6	-21	-7	-4	-2	-11	4	6	8	-18	-3	0	2
10,000	-4.6	-19	-14	-9	-6	-12	-7	-4	-3	-1	4	6	7	-9	-4	-1	1
5,000	5.1	-11	-16	-11	-8	-5	-10	-7	-5	9	4	7	8	-0	-6	-2	0
FT. ST. JOHN TO GRAND PRAIRIE																	
15,000	-14.7	-27	-13	-7	-5	-20	-6	-3	-1	-10	5	7	8	-17	-3	1	3
10,000	-4.6	-18	-14	-8	-5	-10	-6	-3	-1	-0	4	7	8	-8	-3	0	2
5,000	5.1	-11	-16	-10	-7	-4	-9	-6	-4	10	5	8	10	1	-4	-1	1
FT. ST. JOHN TO PRINCE GEORGE																	
15,000	-14.7	-26	-12	-7	-4	-20	-5	-2	-1	-10	5	7	8	-17	-2	1	3
10,000	-4.6	-17	-13	-7	-4	-10	-6	-3	-1	-0	4	7	8	-7	-3	1	2
5,000	5.1	-10	-15	-10	-7	-4	-9	-6	-4	10	5	8	9	1	-4	-1	1
FT. SMITH TO LITTLE ROCK																	
15,000	-14.7	-12	3	6	7	-8	7	9	11	-1	14	15	16	-4	10	13	14
10,000	-4.6	-3	2	5	6	3	7	10	12	10	14	15	16	6	11	13	14
5,000	5.1	4	-1	4	6	11	6	9	11	20	15	17	19	13	8	11	13
FT. SMITH TO TEXARKANA																	
15,000	-14.7	-11	3	6	8	-7	7	10	11	-0	14	15	16	-4	11	13	14
10,000	-4.6	-2	2	5	7	3	8	11	12	10	14	16	16	6	11	13	14
5,000	5.1	5	-0	4	7	11	6	10	12	21	15	18	19	14	9	12	13

\*D--DIFFERENCE BETWEEN INDICATED PER CENT RELIABILITY TEMPERATURE AND INTERNATIONAL STANDARD ATMOSPHERE TEMPERATURE.

FLIGHT IN FEET	ISA TEMP.	ENROUTE TEMPERATURE												STANDARD DEVIATION															
		JANUARY 50 D50 D75 D85				APRIL 50 D50 D75 D85				JULY 50 D50 D75 D85				OCTOBER 50 D50 D75 D85				ANNUAL 50 D50 D75 D85				JAN	APR	JUL	OCT				
FT. SMITH TO TULSA																										90 N.MI.			
15,000	-14.7	-13	2	5	7	-8	6	9	10	-10	14	15	16	-5	10	12	14	-7	8	11	12	5	4	2	3				
10,000	-4.6	-4	1	4	6	2	7	10	12	10	14	16	17	6	10	13	14	4	8	11	12	5	4	2	4				
5,000	5.1	-4	-2	3	6	11	6	9	12	21	16	18	20	13	8	12	14	12	7	11	14	7	6	4	5				
FT. WAYNE TO INDIANAPOLIS																										90 N.MI.			
15,000	-14.7	-16	-2	2	4	-12	2	5	7	-3	12	14	15	-8	7	10	12	-10	5	8	10	5	5	2	4				
10,000	-4.6	-9	-4	-0	2	-3	1	5	7	7	12	13	14	2	7	10	12	-1	4	7	9	6	5	3	5				
5,000	5.1	-3	-8	-3	0	5	-0	4	6	17	12	14	15	9	4	8	10	7	2	6	9	8	6	3	6				
FT. WAYNE TO SOUTH BEND																										66 N.MI.			
15,000	-14.7	-18	-3	1	3	-13	1	4	6	-3	12	13	14	-8	6	9	11	-11	4	7	9	6	5	3	5				
10,000	-4.6	-10	-5	-1	1	-4	0	4	6	6	11	13	14	1	6	9	11	-2	3	7	9	6	5	3	5				
5,000	5.1	-4	-9	-4	-1	4	-1	3	5	16	11	14	15	8	3	7	9	6	1	6	8	8	6	3	6				
FT. WAYNE TO TOLEDO																										73 N.MI.			
15,000	-14.7	-18	-3	1	3	-14	1	4	6	-3	11	13	14	-8	6	9	11	-11	4	7	9	6	5	3	5				
10,000	-4.6	-10	-5	-1	1	-4	0	4	6	6	11	13	14	1	6	9	11	-2	3	7	8	6	5	3	5				
5,000	5.1	-4	-9	-4	-1	4	-1	3	5	16	11	13	15	8	3	7	9	6	1	5	8	8	6	3	6				
FT. WILLIAM TO SAULT STE. MARIE																										227 N.MI.			
15,000	-14.7	-26	-11	-7	-4	-19	-4	-0	2	-7	8	10	12	-13	2	5	8	-16	-1	3	6	7	5	4	6				
10,000	-4.6	-18	-13	-9	-6	-9	-5	-1	1	2	7	10	11	-3	1	5	8	-7	-3	2	5	7	6	4	6				
5,000	5.1	-12	-17	-12	-9	-1	-6	-2	1	13	8	10	12	3	-2	3	5	1	-4	1	4	8	7	4	7				
FT. WILLIAM TO WINNIPEG																										322 N.MI.			
15,000	-14.7	-28	-13	-8	-6	-19	-4	-0	2	-7	8	10	12	-14	1	4	7	-17	-2	2	5	7	5	4	6				
10,000	-4.6	-20	-15	-10	-7	-9	-5	-1	1	2	7	10	11	-4	0	4	7	-8	-3	2	4	7	6	4	6				
5,000	5.1	-13	-18	-12	-10	-1	-7	-2	1	13	8	11	13	4	-2	3	6	1	-4	1	4	8	7	5	7				
FT. WORTH TO HOUSTON																										212 N.MI.			
15,000	-14.7	-9	6	8	10	-6	9	11	13	0	15	16	17	-3	12	14	15	-4	11	13	14	4	3	1	3				
10,000	-4.6	1	6	8	10	6	10	13																					

THE BOEING COMPANY  
TRANSPORT DIVISION

NO. D6-7176  
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## ENROUTE TEMPERATURES AND STANDARD DEVIATION IN DEGREES CELSIUS FOR GREAT CIRCLE AIR ROUTES

HEIGHT IN FEET	ISA TEMP.	ENROUTE TEMPERATURE																				STANDARD DEVIATION							
		JANUARY					APRIL					JULY					OCTOBER					ANNUAL							
		50	D50	D75	D85		50	D50	D75	D85		50	D50	D75	D85		50	D50	D75	D85		50	D50	D75	D85	JAN	APR	JUL	OCT
FRESNO TO SAN FRANCISCO																													
15,000	-14.7	-12	2	6	8	-11	3	6	8	-1	14	16	16	-7	8	11	13	-8	7	10	12	5	4	138	N.MI.	5	4	2	4
10,000	-4.6	-2	2	6	8	-1	4	7	9	11	15	17	18	3	8	11	13	3	7	11	13	6	5	2	5	6	5	2	5
5,000	5.1	4	-1	3	5	9	4	8	10	21	16	18	20	13	8	11	12	12	7	11	13	5	5	3	4	5	5	3	4
FRESNO TO VISALIA																													
15,000	-14.7	-12	3	6	8	-11	4	7	8	-0	15	16	17	-6	9	12	13	-7	7	10	12	5	4	31	N.MI.	5	4	2	4
10,000	-4.6	-2	3	7	9	-0	4	8	9	11	16	17	18	4	9	12	13	3	8	11	13	6	5	2	5	6	5	2	5
5,000	5.1	5	-0	3	5	10	5	8	10	22	17	19	21	14	9	12	13	13	8	12	14	5	5	3	4	5	5	3	4
GAINESVILLE TO JACKSONVILLE																													
15,000	-14.7	-6	8	10	11	-5	9	11	12	-1	14	15	15	-2	13	14	15	-4	11	13	13	3	3	54	N.MI.	3	3	1	2
10,000	-4.6	3	7	9	10	4	9	11	12	8	13	14	14	7	12	14	14	6	10	12	13	3	3	1	2	3	3	1	2
5,000	5.1	9	4	7	8	12	7	9	10	18	13	14	14	14	9	10	11	13	8	10	11	4	3	2	3	4	3	2	3
GAINESVILLE TO OCALA																													
15,000	-14.7	-6	9	11	12	-5	10	12	13	-1	14	15	15	-2	13	14	15	-3	11	13	14	3	3	32	N.MI.	3	3	1	2
10,000	-4.6	3	8	10	11	5	9	11	12	8	13	14	14	8	12	14	15	6	11	12	13	3	3	1	2	3	3	1	2
5,000	5.1	10	5	7	8	13	7	9	11	18	13	14	14	14	9	11	12	13	8	10	11	4	3	2	3	4	3	2	3
GANDER TO ST. JOHNS																													
15,000	-14.7	-22	-7	-2	1	-18	-3	0	2	-7	7	10	11	-13	2	5	7	-15	-0	4	6	7	5	86	N.MI.	7	5	4	5
10,000	-4.6	-15	-10	-5	-2	-8	-4	-0	2	2	6	8	10	-4	0	4	6	-6	-2	2	4	8	5	3	5	8	5	3	5
5,000	5.1	-6	-12	-6	-4	1	-4	-0	2	10	5	7	9	4	-1	3	5	2	-3	1	3	7	5	3	5	7	5	3	5
GANDER TO STEPHENVILLE																													
15,000	-14.7	-24	-9	-4	-1	-19	-4	-1	1	-8	7	9	11	-14	1	5	7	-16	-1	3	5	8	5	4	6	8	5	4	6
10,000	-4.6	-16	-12	-6	-4	-9	-5	-1	1	1	6	8	9	-5	-0	3	5	-7	-3	1	4	8	5	3	6	8	5	3	6
5,000	5.1	-8	-13	-8	-5	0	-5	-1	1	10	5	7	8	3	-2	2	4	1	-4	0	2	8	5	3	6	8	5	3	6
GRAND FORKS TO WINNIPEG																													
15,000	-14.7	-27	-12	-7	-5	-18	-3	0	2	-6	8	11	12	-14	1	5	7	-16	-1	3	5	7	5	4	6	7	5	4	6
10,000	-4.6	-18	-14	-9	-6	-8	-4	0	2	4	8	11	12	-4	1	5	7	-7	-2	3	5	7	6	4	6	7	6	4	6
5,000	5.1	-12	-17	-11	-8	-0	-5	-1	2	14	9	13	14	5	-0	4	7	2	-3	3	6	9	7	5	7	9	7	5	7
GRAND JUNCTION TO LAS VEGAS																													
15,000	-14.7	-15	0	4	6	-11	4	7	8	1	16	17	18	-6	9	11	13	-8	7	10	12	6	4	2	4	6	4	2	4
10,000	-4.6	-4	0	4	6	1	5	9	10	13	18	20	21	4	9	12	14	4	8	12	14	6	5	2	5	6	5	2	5
5,000	5.1	3	-2	2	4	14	9	12	14	27	22	24	25	16	11	15	17	15	10	15	17	5	5	3	5	7	5	3	5
GRAND RAPIDS TO LAND O LAKES																													
15,000	-14.7	-22	-7	-3	-1	-16	-2	2	4	-5	10	12	13	-11	4	7	9	-13	1	5	7	6	5	3	5	7	5	3	5
10,000	-4.6	-14	-9	-5	-2	-7	-2	1	3	5	9	12	13	-1	4	8	10	-4	0	5	7	7	6	3	6	8	6	3	6
5,000	5.1	-8	-13	-8	-6	1	-4	1	3	15	10	12	14	6	1	5	8	3	-2	3	6	8	7	4	7	9	7	4	7
GRAND RAPIDS TO LANSING																													
15,000	-14.7	-20	-5	-1	1	-15	-0	3	5	-4	11	13	14	-10	5	8	10	-12	3	6	8	6	5	3	5	7	5	3	5
10,000	-4.6	-12	-7	-3	-1	-6	-1	2	4	5	10	12	13	0	5	9	10	-3	2	6	8	6	5	3	5	7	6	3	5
5,000	5.1	-6	-11	-6	-3	2	-3	2	4	15	10	13	14	7	2	6	8	5	-0	4	7	8	6	4	6	8	6	4	6
GRAND RAPIDS TO MILWAUKEE																													
15,000	-14.7	-20	-5	-1	1	-15	-0	3	5	-4	11	13	14	-10	5	8	10	-12	3	6	8	6	5	3	5	7	5	3	5
10,000	-4.6	-12	-7	-3	-1	-6	-1	3	5	6	10	12	13	0	5	9	11	-3	2	6	8	6	5	3	5	7	6	3	5
5,000	5.1	-6	-11	-6	-3	2	-3	2	4	16	11	13	14	7	2	6	9	5	-0	5	7	8	7	4	6	8	7	4	6
GRAND RAPIDS TO MUSKOGON																													
15,000	-14.7	-20	-5	-1	1	-15	-0	3	5	-4	11	13	14	-10	5	8	10	-12	2	6	8	6	5	3	5	7	5	3	5
10,000	-4.6	-12	-7	-3	-1	-6	-1	2	4	5	10	12	13	0	5	8	10	-3	2	6	8	6	5	3	5	7	6	3	5
5,000	5.1	-6	-11	-6	-4	2	-3	2	4	15	10	13	14	7	2	6	8	5	-0	4	7	8	7	4	6	8	7	4	6
GRAND RAPIDS TO SAGINAW																													
15,000	-14.7	-20	-5	-1	1	-15	-1	3	4	-4	10	12	13	-10	5	8	10	-12	2	6	8	6	5	3	5	7	5	3	5
10,000	-4.6	-12	-8	-3	-1	-6	-2	2	4	5	10	12	13	0	5	8	10	-3	1	5	7	6	5	3	5	7	6	3	5
5,000	5.1	-6	-12	-6	-4	2	-3	1	4	15	10	13	14	7	2	6	8	4	-1	4	7	8	7	4	6	8	7	4	6
GREAT FALLS TO HELENA																													
15,000	-14.7	-24	-9	-4	-1	-16	-1	2	4	-4	10	12	14	-12	2	6	8	-14	1	5	7	7	5	3	5	7	5	3	5
10,000	-4.6	-13	-8	-3	-1	-6	-1	2	4	7	12	14	16</																

## ENROUTE TEMPERATURES AND STANDARD DEVIATION IN DEGREES CELSIUS FOR GREAT CIRCLE AIR ROUTES

FLIGHT IN FEET	ISA TEMP.	ENROUTE TEMPERATURE																STANDARD DEVIATION							
		JANUARY				APRIL				JULY				OCTOBER				ANNUAL							
		50	D50	D75	D85	50	D50	D75	D85	50	D50	D75	D85	50	D50	D75	D85	50	D50	D75	D85	JAN	APR	JUL	OCT
GREENSBORO TO NEW YORK																								397 N.MI.	
15,000	-14.7	-14	1	4	6	-12	3	6	7	-3	12	13	14	-7	8	11	12	-9	6	9	10	5	4	2	4
10,000	-4.6	-6	-1	2	4	-2	2	5	7	7	11	13	13	3	7	10	12	0	5	8	9	5	5	2	4
5,000	5.1	0	-5	-0	2	6	1	5	6	16	11	13	14	10	4	8	10	8	3	7	8	7	5	3	5
GREENSBORO TO PITTSBURGH																								263 N.MI.	
15,000	-14.7	-14	1	4	6	-11	3	6	8	-3	12	14	14	-7	8	11	12	-9	6	9	10	5	4	2	4
10,000	-4.6	-6	-1	2	4	-2	2	6	7	7	11	13	14	3	7	10	12	0	5	8	9	5	5	2	4
5,000	5.1	0	-5	0	3	6	1	5	7	16	11	13	14	10	4	8	10	8	3	7	9	7	5	3	5
GREENSBORO TO RALEIGH																								58 N.MI.	
15,000	-14.7	-11	3	6	8	-9	5	8	9	-2	13	14	15	-5	9	12	13	-7	8	10	11	4	4	2	3
10,000	-4.6	-3	1	4	6	-0	4	7	9	7	12	13	14	4	9	11	12	2	7	9	10	4	4	2	4
5,000	5.1	4	-1	3	5	8	3	6	8	17	12	14	14	11	6	9	10	10	5	8	10	6	5	3	4
GREENSBORO TO RICHMOND																								152 N.MI.	
15,000	-14.7	-12	2	5	7	-10	5	7	9	-2	12	14	15	-6	9	11	13	-8	7	10	11	4	4	2	4
10,000	-4.6	-4	0	4	5	-1	4	7	8	7	12	13	14	4	8	11	12	1	6	9	10	5	4	2	4
5,000	5.1	3	-2	2	4	8	2	6	8	17	12	13	14	10	5	8	10	9	4	8	9	6	5	3	5
GREENSBORO TO ROANOKE																								73 N.MI.	
15,000	-14.7	-12	2	5	7	-10	5	7	9	-2	12	14	15	-6	9	11	13	-8	7	10	11	4	4	2	4
10,000	-4.6	-4	1	4	5	-1	4	7	8	7	12	13	14	4	8	11	12	1	6	9	10	5	4	2	4
5,000	5.1	3	-2	2	4	8	3	6	8	17	12	14	14	11	5	9	10	9	4	8	10	6	5	3	5
GREENSBORO TO WASHINGTON, D.C.																								216 N.MI.	
15,000	-14.7	-13	2	5	6	-11	4	7	8	-2	12	14	14	-6	8	11	12	-8	7	9	11	5	4	2	4
10,000	-4.6	-5	0	3	5	-2	3	6	8	7	11	13	14	3	8	10	12	1	5	8	10	5	4	2	4
5,000	5.1	2	-3	1	3	7	2	5	7	16	11	13	14	10	5	8	10	9	4	7	9	7	5	3	5
GREENVILLE TO RICHMOND																								291 N.MI.	
15,000	-14.7	-12	3	6	7	-10	5	8	9	-2	13	14	15	-5	9	12	13	-7	7	10	11	4	4	2	3
10,000	-4.6	-3	1	4	6	-0	4	7	9	7	12	13	14	4	9	11	12	2	6	9	10	5	4	2	4
5,000	5.1	3	-2	2	5	8	3	6	8	17	12	14	15	11	6	9	10	10	5	8	10	6	5	3	4
GREENVILLE TO SPARTANBURG																								19 N.MI.	
15,000	-14.7	-10	4	7	8	-8	6	9	10	-2	13	14	15	-5	10	12	13	-6	8	11	12	4	4	2	3
10,000	-4.6	-2	3	5	7	1	6	8	10	8	12	14	14	5	10	12	13	3	8	10	11	4	4	2	3
5,000	5.1	5	-0	4	6	9	4	7	9	18	13	14	15	12	7	10	11	11	6	9	11	6	5	2	4
GREENVILLE TO WINSTON-SALEM																								129 N.MI.	
15,000	-14.7	-11	4	6	8	-9	6	8	10	-2	13	14	15	-5	10	12	13	-7	8	10	12	4	4	2	3
10,000	-4.6	-3	2	5	6	1	5	8	9	7	12	13	14	5	9	11	13	2	7	9	11	4	4	2	3
5,000	5.1	4	-1	3	5	9	4	7	9	17	12	14	15	11	6	9	11	10	5	9	10	6	5	2	4
HALIFAX TO MONCTON																								89 N.MI.	
15,000	-14.7	-21	-7	-2	0	-18	-3	0	2	-6	8	11	12	-12	3	7	9	-14	0	4	6	7	5	3	5
10,000	-4.6	-14	-10	-5	-2	-9	-4	-1	1	3	7	10	11	-3	2	6	8	-6	-1	3	5	7	5	3	5
5,000	5.1	-8	-14	-8	-5	0	-5	-1	1	12	7	9	11	4	-1	3	5	2	-3	1	4	8	5	3	6
HALIFAX TO ST. JOHN																								104 N.MI.	
15,000	-14.7	-21	-6	-2	1	-18	-3	0	2	-6	9	11	12	-11	3	7	9	-14	1	5	7	7	5	3	5
10,000	-4.6	-14	-9	-5	-2	-9	-4	-1	1	3	8	10	11	-2	2	6	8	-5	-1	3	5	7	5	3	5
5,000	5.1	-8	-13	-8	-5	0	-5	-1	1	13	8	10	11	5	-0	4	6	2	-3	2	4	8	5	3	6
HALIFAX TO SYDNEY																								165 N.MI.	
15,000	-14.7	-21	-6	-2	1	-18	-3	1	2	-6	8	11	12	-11	3	7	9	-14	1	4	7	7	5	3	5
10,000	-4.6	-14	-9	-5	-2	-8	-4	-0	2	3	8	10	11	-3	2	6	8	-6	-1	3	5	7	5	3	5
5,000	5.1	-8	-13	-8	-5	1	-4	-1	1	12	7	9	10	5	-1	3	5	2	-3	2	4	8	5	3	6
HARRISBURG TO PITTSBURGH																								155 N.MI.	
15,000	-14.7	-16	-2	2	4	-13	2	5	6	-3	12	13	14	-8	7	10	11	-10	5	8	9	5	5	2	4
10,000	-4.6	-9	-4	0	2	-4	0	4	6	6	11	12	13	2	6	9	11	-1	3	7	8	6	5	2	5
5,000	5.1	-2	-8	-2	0	4	-1	3	6	16	11	13	14	8	3	7	9	6	1	5	8	8	6	3	6
HARRISBURG TO READING																								42 N.MI.	
15,000	-14.7	-16	-1	2	4	-13	2	5	6	-3	12	13	14	-8	7	10	11	-10	5	8	10	5	5	2	4
10,000	-4.6	-8	-4	0	2	-4	0	4	5	6	11	12	13	2	6	9	11	-1	3	7	8	6	5	2	4
5,000	5.1	-2	-7	-2	0	4	-1	3	5	15	10	12	13	8	3	7	9	6	1	5	7	7	6	3	5
HARRISBURG TO WASHINGTON, D.C.																								82 N.MI.	
15,000	-14.7	-15	-1	3	5	-12	2	5	7	-3	12	13	14	-7	7	10	12	-9	5	8	10	5	4	2	4
10,000	-4.6	-7	-3	1	3	-3	1	4	6	6	11	13	13	2	7	10	11	-1	4	7	9	6	5	2	4
5,000	5.1	-1	-6	-1	1	5	0	4	6	16	11	13	14	9	4	7	9	7	2	6	8	7	6	3	5
HARRISBURG TO WILLIAMSPORT																								61 N.MI.	
15,000	-14.7	-17	-2	2	4	-14	1	4	6	-3	11	13	14	-8	7	10	11	-10	4	7	9	6	5	3	

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## ENROUTE TEMPERATURES AND STANDARD DEVIATION IN DEGREES CELSIUS FOR GREAT CIRCLE AIR ROUTES

\*D--DIFFERENCE BETWEEN INDICATED PER CENT RELIABILITY TEMPERATURE AND INTERNATIONAL STANDARD ATMOSPHERE TEMPERATURE.

## ENROUTE TEMPERATURES AND STANDARD DEVIATION IN DEGREES CELSIUS FOR GREAT CIRCLE AIR ROUTES

HEIGHT IN FEET	ISA TEMP.	ENROUTE TEMPERATURE												STANDARD DEVIATION											
		JANUARY				APRIL				JULY				OCTOBER				ANNUAL				JAN	APR	JUL	OCT
		50	D50	D75	D85	50	D50	D75	D85	50	D50	D75	D85	50	D50	D75	D85	50	D50	D75	D85				
JACKSON TO SHREVEPORT																									182 N.MI.
15,000	-14.7	-9	5	8	9	-6	8	11	12	-0	14	15	16	-3	12	14	15	-5	10	12	13	4	3	2	3
10,000	-4.6	0	5	7	9	4	9	11	13	10	14	15	16	7	12	14	15	5	10	12	13	4	4	2	3
5,000	5.1	7	2	5	7	12	7	10	12	19	14	16	17	14	9	11	13	13	8	11	13	5	4	2	4
JACKSONVILLE TO MACON																									171 N.MI.
15,000	-14.7	-8	7	9	10	-6	8	11	12	-1	14	15	15	-3	12	14	15	-4	10	12	13	3	3	2	3
10,000	-4.6	1	6	8	9	3	8	10	11	8	13	14	14	7	11	13	14	5	9	11	12	3	3	1	3
5,000	5.1	8	3	6	7	11	6	9	10	18	13	14	15	13	8	10	11	13	7	10	11	4	4	2	3
JACKSONVILLE TO MELBOURNE																									149 N.MI.
15,000	-14.7	-6	9	11	12	-5	10	12	13	-1	14	15	15	-2	13	14	15	-3	11	13	14	3	3	1	2
10,000	-4.6	3	8	10	11	4	9	11	12	8	13	14	14	8	12	14	14	6	10	12	13	3	3	1	2
5,000	5.1	10	5	7	8	12	7	9	10	17	12	13	14	14	9	11	12	13	8	10	11	4	3	1	3
JACKSONVILLE TO MIAMI																									286 N.MI.
15,000	-14.7	-5	10	11	12	-4	10	12	13	-1	14	15	15	-1	13	15	15	-3	12	13	14	3	3	1	2
10,000	-4.6	4	9	10	11	5	10	11	12	8	13	14	14	8	12	14	15	6	11	12	13	3	3	1	2
5,000	5.1	11	5	8	9	13	8	10	11	17	12	13	14	14	9	11	12	14	9	10	11	3	3	1	2
JACKSONVILLE TO ORLANDO																									113 N.MI.
15,000	-14.7	-6	9	11	12	-5	10	12	13	-1	14	15	15	-2	13	14	15	-3	11	13	14	3	3	1	2
10,000	-4.6	3	8	10	11	4	9	11	12	8	13	14	14	8	12	14	14	6	10	12	13	3	3	1	2
5,000	5.1	10	5	7	8	12	7	9	10	18	12	13	14	14	9	11	12	13	8	10	11	4	3	2	3
JACKSONVILLE TO SARASOTA																									187 N.MI.
15,000	-14.7	-6	9	11	12	-5	10	12	13	-1	14	15	15	-2	13	15	15	-3	11	13	14	3	3	1	2
10,000	-4.6	3	8	10	11	5	9	11	12	8	13	14	14	8	12	14	15	6	11	12	13	3	3	1	2
5,000	5.1	10	5	7	9	13	8	10	11	18	12	13	14	14	9	11	12	14	9	10	11	4	3	1	3
JACKSONVILLE TO SAVANNAH																									99 N.MI.
15,000	-14.7	-7	7	10	11	-6	9	11	12	-1	14	15	15	-3	12	14	15	-4	10	12	13	3	3	1	2
10,000	-4.6	2	6	8	10	3	8	10	11	8	13	14	14	7	11	13	14	5	10	11	12	3	3	1	3
5,000	5.1	8	3	6	8	12	6	9	10	18	12	14	14	13	8	10	11	13	8	10	11	4	3	2	3
JACKSONVILLE TO TALLAHASSEE																									141 N.MI.
15,000	-14.7	-7	8	10	11	-5	9	11	12	-1	14	15	15	-2	12	14	15	-4	11	13	13	3	3	1	2
10,000	-4.6	2	7	9	10	4	9	11	12	8	13	14	14	7	12	14	14	6	10	12	13	3	3	1	2
5,000	5.1	9	4	7	8	12	7	9	10	18	13	14	14	14	9	10	12	13	8	10	11	4	3	2	3
JACKSONVILLE TO TAMPA																									154 N.MI.
15,000	-14.7	-6	9	11	12	-5	10	12	13	-1	14	15	15	-2	13	14	15	-3	11	13	14	3	3	1	2
10,000	-4.6	3	8	10	11	5	9	11	12	8	13	14	14	8	12	14	15	6	11	12	13	3	3	1	2
5,000	5.1	10	5	7	9	13	8	10	11	18	12	13	14	14	9	11	12	14	8	10	11	4	3	1	3
JACKSONVILLE TO WAYCROSS																									64 N.MI.
15,000	-14.7	-7	8	10	11	-6	9	11	12	-1	14	15	15	-2	12	14	15	-4	11	12	13	3	3	1	2
10,000	-4.6	2	7	9	10	4	8	10	12	8	13	14	14	7	12	13	14	5	10	11	12	3	3	1	2
5,000	5.1	9	4	6	8	12	7	9	10	18	13	14	14	13	8	10	11	13	8	10	11	4	3	2	3
JACKSONVILLE TO WEST PALM BEACH																									238 N.MI.
15,000	-14.7	-5	9	11	12	-5	10	12	13	-1	14	15	15	-2	13	15	15	-3	12	13	14	3	3	1	2
10,000	-4.6	4	8	10	11	5	9	11	12	8	13	14	14	8	12	14	15	6	11	12	13	3	3	1	2
5,000	5.1	10	5	7	9	13	8	10	11	17	12	13	14	14	9	11	12	14	9	10	11	3	3	1	2
JOPLIN TO SPRINGFIELD, MO.																									54 N.MI.
15,000	-14.7	-14	1	4	6	-9	5	8	9	-1	14	15	16	-5	9	12	13	-7	7	10	12	5	4	2	4
10,000	-4.6	-5	0	3	5	1	6	9	10	9	14	15	16	5	9	12	14	2	7	10	12	5	5	2	4
5,000	5.1	2	-3	1	4	9	4	8	10	20	15	17	19	12	7	11	13	11	6	10	12	7	6	4	6
JOPLIN TO TULSA																									88 N.MI.
15,000	-14.7	-14	1	4	6	-9	6	8	10	-1	14	15	16	-5	10	12	13	-7	8	10	12	5	4	2	4
10,000	-4.6	-5	0	3	5	2	6	9	11	10	14	16	17	5	10	12	14	3	8	10	12	5	5	2	4
5,000	5.1	2	-3	2	5	10	5	9	11	21	16	18	19	13	8	11	13	11	6	11	13	7	6	4	5
KANSAS CITY TO MINNEAPOLIS																									351 N.MI.
15,000	-14.7	-19	-4	-0	2	-13	1	5	6	-3	12	14	15	-9	6	9	11	-11	4	8	9	6	5	3	5
10,000	-4.6	-10	-5	-1	1	-3	1	5	7	8	12	14	15	2	6	10	12	-1	4	7	10	6	5	3	5
5,000	5.1	-4	-9	-4	-1	5	-0	4	7	18	13	16	17	9	4	8	11	7	2	7	10	8	7	4	7
KANSAS CITY TO OMAHA																									144 N.MI.
15,000	-14.7	-17	-2	1	3	-11	3	6	8	-1	13	15	16	-7	8	11	12	-9	6	9	11	5	4	2	4
10,000	-4.6	-8	-3	1	3	-1	4	7	9	9	14	16	16	3	8	11	13	1	5	9	11	6	5	3	5
5,000	5.1	-1	-6	-1	2	7	2	7	9	20	15	18	19	11	6	10	12	9	4	9	12	8	7	4	6
KANSAS CITY TO ST. LOUIS																									199 N.MI.
15,000	-14.7	-15	-1	3	5	-11	4	7	8	-1	13	15	16	-6	8	11	12	-8	6	9	11	5	4	2	4
10,000	-4.6	-7	-2	1	3	-1	4	7	9	9	13	15	16	4	8	11	13	1	6	9	11	5	5	2	5
5,000	5.1	-1	-6	-1	2	7	2	6	9	19	14	16	18	11	6	10	12	9	4	8	11	8	6	3	6
KANSAS CITY TO SPRINGFIELD, MO.																									126 N.MI.
15,000	-14.7	-15	-0	3	5	-10	5	7	9	-1	14	15	16	-6	9	11	13	-8	7	10	11	5	4	2	4
10,000	-4.6	-6	-1	2	4	0	5	8	10	9	14	15	16	4	9	12	13	2	6	10	11	5	5	2	4
5,000	5.1	0	-5	0	3	8	3	7	10	20	15	17	18	12	7	10	13	10	5	9	12	8	6	4	6
KANSAS CITY TO TULSA																									185 N.MI.
15,000	-14.7	-14	0	3	5	-10	5	8	9	-1	14	15	16	-6	9	12	13	-8	7	10	11	5	4	2	4
10,000	-4.6	-5	-1	3	5	1	5	9	10	10	14	16	16	4	9	12	13	2	7	10	12	5	5	2	4
5,000	5.1	1	-4	1	4	9	4	8	10	21	15	18	19	12	7	11	13	11	6	10	13	8	6	4	6
KANSAS CITY TO WICHITA																									154 N.MI.
15,000	-14.7	-15	-1	3	5	-10	5	7	9	-1	14	15	16	-6	9	11	13	-8	7	10	11	5	4	2	4
10,000	-4.6	-6	-1	2	4	0	5	8	10	10	14	16	17	4	9	12	13	2	7	10	12	5	5	2	4
5,000	5.1	1	-5	1	4	9	4	8	10	21	16	18	20	12	7	11	13	10	5	10	13	8	6	4	6

## ENROUTE TEMPERATURES AND STANDARD DEVIATION IN DEGREES CELSIUS FOR GREAT CIRCLE AIR ROUTES

HEIGHT IN FEET	ISA TEMP.	ENROUTE TEMPERATURE												STANDARD DEVIATION													
		JANUARY 50 D50 D75 D85				APRIL 50 D50 D75 D85				JULY 50 D50 D75 D85				OCTOBER 50 D50 D75 D85				ANNUAL 50 D50 D75 D85				JAN	APR	JUL	OCT		
KEENE TO NEW YORK																											
15,000	-14.7	-18	-3	1	3	-15	-0	3	5	-4	11	12	13	-9	6	9	11	-11	3	7	9	6	5	3	5	152 N.MI.	
10,000	-4.6	-10	-6	-2	1	-6	-1	2	4	5	10	12	12	0	5	8	10	-3	2	5	7	6	5	3	5		
5,000	5.1	-4	-9	-5	-2	3	-3	1	3	14	9	11	12	7	2	6	8	5	-0	4	6	7	6	3	5		
KEENE TO PITTSFIELD																											
15,000	-14.7	-19	-4	-0	2	-16	-1	2	4	-5	10	12	13	-10	5	8	10	-12	2	6	8	6	5	3	5	54 N.MI.	
10,000	-4.6	-12	-7	-3	-0	-7	-2	1	3	5	9	11	12	-0	4	8	10	-4	1	5	7	6	5	3	5		
5,000	5.1	-6	-11	-6	-3	2	-3	0	2	14	9	11	12	7	2	5	7	4	-1	3	6	7	6	3	6		
KEY WEST TO MIAMI																											
15,000	-14.7	-3	11	13	14	-3	12	13	14	-1	14	15	15	-0	14	16	16	-2	13	14	15	2	2	1	2	109 N.MI.	
10,000	-4.6	6	10	12	13	6	11	13	14	9	13	14	14	9	13	14	15	7	12	13	13	2	3	1	2		
5,000	5.1	12	7	9	10	14	9	11	11	17	12	13	13	15	10	12	12	15	10	11	12	3	2	1	2		
KNOXVILLE TO LEXINGTON																											
15,000	-14.7	-13	2	5	7	-10	5	8	9	-2	13	14	15	-6	9	11	13	-8	7	10	11	4	4	2	4	136 N.MI.	
10,000	-4.6	-5	0	3	5	-0	4	7	9	8	12	14	14	4	9	11	13	2	6	9	10	5	4	2	4		
5,000	5.1	2	-3	1	4	8	3	6	8	18	12	14	15	11	6	9	11	10	4	8	10	7	5	3	5		
KNOXVILLE TO LOUISVILLE																											
15,000	-14.7	-13	2	5	7	-10	5	8	9	-2	13	14	15	-6	9	11	13	-8	7	10	11	5	4	2	4	165 N.MI.	
10,000	-4.6	-5	-0	3	5	-0	4	7	9	8	12	14	14	4	9	11	13	2	6	9	10	5	4	2	4		
5,000	5.1	2	-3	1	4	8	3	6	8	18	13	14	15	11	6	9	11	10	4	8	10	7	5	3	5		
KNOXVILLE TO MEMPHIS																											
15,000	-14.7	-11	3	6	8	-8	6	9	10	-1	13	15	15	-5	10	12	13	-6	8	11	12	4	4	2	3	297 N.MI.	
10,000	-4.6	-3	2	5	6	1	6	9	10	8	13	14	15	5	10	12	14	3	8	10	11	4	4	2	4		
5,000	5.1	4	-1	3	5	9	4	7	9	18	13	15	15	12	7	10	12	11	6	9	11	6	5	3	5		
KNOXVILLE TO NASHVILLE																											
15,000	-14.7	-12	3	6	7	-9	6	8	10	-2	13	14	15	-5	10	12	13	-7	8	10	12	4	4	2	3	132 N.MI.	
10,000	-4.6	-3	1	4	6	1	5	8	10	8	13	14	15	5	9	12	13	2	7	10	11	5	4	2	4		
5,000	5.1	3	-2	2	5	9	4	7	9	18	13	15	16	11	6	10	11	10	5	9	10	6	5	3	5		
KNOXVILLE TO PITTSBURG																											
15,000	-14.7	-14	1	4	6	-11	4	7	8	-2	12	14	15	-7	8	11	12	-9	6	9	11	5	4	2	4	332 N.MI.	
10,000	-4.6	-6	-1	2	4	-2	3	6	8	7	12	13	14	3	8	11	12	1	5	8	10	5	5	2	4		
5,000	5.1	0	-5	0	3	7	2	5	7	17	12	14	15	10	5	8	10	8	3	7	9	7	6	3	5		
KNOXVILLE TO WASHINGTON, D.C.																											
15,000	-14.7	-13	2	5	6	-10	4	7	8	-2	12	14	15	-6	9	11	12	-8	7	9	11	5	4	2	4	378 N.MI.	
10,000	-4.6	-5	-0	3	5	-1	3	6	8	7	12	13	14	4	8	11	12	1	6	8	10	5	4	2	4		
5,000	5.1	2	-3	1	4	7	2	6	8	17	12	14	15	10	5	8	10	9	4	7	9	7	5	3	5		
LAFAYETTE TO LAKE CHARLES																											
15,000	-14.7	-8	7	9	10	-5	10	12	13	0	15	16	16	-2	13	14	15	-4	11	13	14	3	3	1	2	60 N.MI.	
10,000	-4.6	2	7	9	10	6	10	12	14	10	14	15	16	8	13	14	15	6	11	13	14	3	3	1	3		
5,000	5.1	9	4	7	9	14	8	11	12	19	14	16	16	14	9	11	12	14	9	11	13	5	4	2	3		
LAFAYETTE TO NEW ORLEANS																											
15,000	-14.7	-7	7	9	10	-5	10	12	13	-0	15	16	16	-2	13	14	15	-4	11	13	14	3	3	1	2	92 N.MI.	
10,000	-4.6	3	7	9	11	5	10	12	13	10	14	15	16	8	13	14	15	6	11	13	14	3	3	1	2		
5,000	5.1	9	4	7	8	13	8	11	12	19	14	15	16	14	9	11	12	14	9	11	12	4	4	2	3		
LAKELAND TO TAMPA																											
15,000	-14.7	-5	9	11	12	-1	14	15	15	-1	14	15	15	-1	13	15	15	-3	12	13	14	3	3	1	2	27 N.MI.	
10,000	-4.6	4	9	11	11	5	10	12	13	9	13	14	15	8	13	14	15	6	11	12	13	3	3	1	2		
5,000	5.1	11	6	8	9	13	8	10	11	18	12	13	14	15	9	11	12	14	9	11	11	3	3	1	2		
LANCASTER TO READING																											
15,000	-14.7	-16	-1	2	4	-13	2	5	6	-3	12	13	14	-8	7	10	11	-10	5	8	10	5	5	2	4	22 N.MI.	
10,000	-4.6	-8	-4	0	2	-4	0	4	5	6	11	12	13	2	6	9	11	-1	3	7	8	6	5	2	4		
5,000	5.1	-2	-7	-2	0	4	-1	3	5	15	10	12	13	8	3	7	9	7	1	5	7	7	6	3	5		
LANCASTER TO WASHINGTON																											
15,000	-14.7	-15	-1	3	5	-12	2	5	7	-3	12	13	14	-7	7	10	12	-9	5	8	10	5	4	2	4	83 N.MI.	
10,000	-4.6	-7	-3	1	3	-3	1	4	6	6	11	13	13	2	7	10	11	-1	4	7	9	6	5	2	4		
5,000	5.1	-1	-6	-1	1	5	0	4	6	16	11	13	14	9	4	7	9	7	2	6	8	7	6	3	5		
LAS VEGAS TO LOS ANGELES																											
15,000	-14.7	-11	3	7	9	-10	5	8	9	1	15	17	17	-5	10	12	14	-6	8	11	13	5	4	2	4	205 N.MI.	
10,000	-4.6	-1	4	8	10	2	6	9	11	12	17	18	19	5	10	13	14	5	9	12	14	5	5	2	4		
5,000	5.1	6	1	4	6	13	7	11	13	24	19	21	22	16	11	14	15	15	10	13	15	5	5	3	4		
LAS VEGAS TO PALM SPRINGS																											
15,000	-14.7	-11	3	7	9	-9	5	8	9	1	16	17	17	-5	10	12	14	-6	8	11	13	5	4	2	4	150 N.MI.	
10,000	-4.6	-1	4	8	10	2	6	9	11	12	17	19	19	5	10	13	14	5	9	12	14	5	5	2	4		
5,000	5.1	6	1	4	6	13	8	12	13	24	19	21	22	17	12	14	16	15	10	14	16	5	5	3	4		
LAS VEGAS TO PHOENIX																											
15,000	-14.7	-11	3	7	9	-9	6	8	10	1	16	17	18	-5	10	12	14	-6	9	12	13	5	4	2	4	222 N.MI.	
10,000	-4.6	-1	4	7	9	2	7	10	12	13	18	19	20	6	10	13	14	5	10	13	14	5	4	2	4		
5,000	5.1	6	1	5	6	15	10	13	15	26	21	23	24	18	13	16	17	16	11	15	17	5	5	3	4		
LAS VEGAS TO SACRAMENTO																											
15,000	-14.7	-13	2	6	8	-11	4	6	8	-0	15	16	17	-6	8	11	13	-8	7	10	12	6	4	2	4	336 N.MI.	
10,000	-4.6	-3	2	6	8	-0	4	8	9	12	16	18	19	4	8	11	13	3	8	11	13	6	5	2	5		
5,000	5.1	4	-1	3	5	11	6	9	11	23	18	20	21	15	9	12	14	13	8	12	15	5	5	3	4		
LAS VEGAS TO SALT LAKE CITY																											
15,000	-14.7	-15	-0	4	6	-11	3	6	8	0	15	17	17	-7	8	11	13	-8	7	10	12	6	4	2	4	320 N.MI.	
10,000	-4.6	-5	-0	4	6	-0	3	8	10	13	17	19	20	4	8	11	13	3	8	11	13	6	5	3	5		
5,000	5.1	3	-2	1	3	13	7	11	13	26	21	23	25	15	10	14	16	14	9	14	16	5	5	4	5		

\*D--DIFFERENCE BETWEEN INDICATED PER CENT RELIABILITY TEMPERATURE AND INTERNATIONAL STANDARD ATMOSPHERE TEMPERATURE.

## ENROUTE TEMPERATURES AND STANDARD DEVIATION IN DEGREES CELSIUS FOR GREAT CIRCLE AIR ROUTES

HEIGHT IN FEET	ISA TEMP.	ENROUTE TEMPERATURE																STANDARD DEVIATION							
		JANUARY 50 D50 D75 D85				APRIL 50 D50 D75 D85				JULY 50 D50 D75 D85				OCTOBER 50 D50 D75 D85				ANNUAL 50 D50 D75 D85				JAN	APR	JUL	OCT
LAS VEGAS TO SAN FRANCISCO																						359 N.MI.			
15,000	-14.7	-13	2	6	8	-11	4	7	8	-0	15	16	17	-6	9	11	13	-7	7	10	12	6	4	2	4
10,000	-4.6	-2	2	6	8	-0	5	8	9	11	16	18	19	4	8	12	13	3	8	11	13	6	5	2	5
5,000	5.1	4	-1	3	5	11	6	9	11	23	18	20	21	15	9	12	14	13	8	12	14	5	5	3	4
LAWRENCE TO MANCHESTER																						19 N.MI.			
15,000	-14.7	-19	-4	-0	2	-16	-2	2	3	-5	10	12	13	-10	5	8	10	-12	2	6	8	6	5	3	5
10,000	-4.6	-12	-7	-3	-1	-7	-3	1	2	4	9	11	12	-0	4	8	10	-4	1	5	6	6	5	3	5
5,000	5.1	-6	-11	-6	-4	1	-4	0	2	14	9	11	12	7	2	5	7	4	-1	3	5	7	6	3	6
LAWRENCE TO WORCESTER																						42 N.MI.			
15,000	-14.7	-18	-4	0	2	-16	-1	2	4	-5	10	12	13	-9	5	8	10	-12	3	6	8	6	5	3	5
10,000	-4.6	-11	-7	-2	-0	-7	-2	1	3	5	9	11	12	-0	4	8	10	-3	1	5	7	6	5	3	5
5,000	5.1	-5	-10	-6	-3	2	-3	0	2	14	9	11	12	7	2	5	7	4	-1	3	6	7	6	3	5
LAWTON TO OKLAHOMA CITY																						63 N.MI.			
15,000	-14.7	-12	2	5	7	-8	7	10	11	-0	15	16	16	-4	10	13	14	-6	9	11	12	5	4	2	3
10,000	-4.6	-3	2	5	7	4	8	11	13	11	15	17	17	6	11	13	15	4	9	12	13	5	4	2	4
5,000	5.1	5	-0	4	7	12	7	11	13	22	17	20	21	15	9	13	15	13	8	13	15	7	6	4	5
LAWTON TO WICHITA FALLS																						35 N.MI.			
15,000	-14.7	-12	3	6	8	-7	8	10	11	0	15	16	17	-4	11	13	14	-6	9	11	13	4	4	2	3
10,000	-4.6	-2	2	5	7	4	9	12	13	11	15	17	17	6	11	13	15	5	9	12	13	5	4	2	4
5,000	5.1	5	0	5	8	13	8	12	14	22	17	20	21	15	10	13	15	14	9	13	16	7	6	4	5
LEBANON TO MANCHESTER																						57 N.MI.			
15,000	-14.7	-19	-5	-1	2	-17	-2	1	3	-5	10	12	13	-10	5	8	10	-13	2	6	8	6	5	3	5
10,000	-4.6	-12	-8	-3	-1	-8	-3	0	2	4	9	11	12	-1	4	7	9	-4	0	4	6	7	5	3	5
5,000	5.1	-6	-12	-7	-4	1	-4	-0	2	14	9	11	12	6	1	5	7	4	-2	3	5	7	6	3	6
LEBANON TO MONTPELIER																						36 N.MI.			
15,000	-14.7	-20	-6	-1	1	-18	-3	1	2	-5	9	11	12	-11	4	8	9	-13	1	5	7	6	5	3	5
10,000	-4.6	-13	-9	-4	-2	-9	-4	-0	1	4	8	10	11	-1	3	7	9	-5	-0	4	6	7	5	3	5
5,000	5.1	-7	-12	-8	-5	0	-5	-1	1	13	8	10	12	6	1	5	7	3	-2	2	5	7	6	3	6
LEWISTON, TO PORTLAND, ME.																						29 N.MI.			
15,000	-14.7	-20	-5	-1	1	-18	-3	0	2	-6	9	11	12	-11	4	8	9	-13	1	5	7	6	5	3	5
10,000	-4.6	-13	-9	-4	-2	-9	-4	-1	1	4	8	10	11	-1	3	7	9	-5	-0	4	6	7	5	3	5
5,000	5.1	-7	-12	-8	-5	0	-5	-1	1	13	8	10	11	6	1	5	7	3	-2	2	5	7	6	3	6
LEXINGTON TO LOUISVILLE																						54 N.MI.			
15,000	-14.7	-14	1	4	6	-11	4	7	8	-2	13	14	15	-6	8	11	12	-8	6	9	11	5	4	2	4
10,000	-4.6	-6	-1	2	4	-1	3	6	8	7	12	14	14	4	8	11	12	1	6	8	10	5	5	2	4
5,000	5.1	0	-5	0	3	7	2	6	8	17	12	14	15	10	5	9	11	9	4	7	10	7	6	3	5
LINCOLN TO OMAHA																						0 N.MI.			
15,000	-14.7	-18	-3	1	3	-12	3	6	7	-2	13	15	16	-8	7	10	12	-10	5	8	10	6	4	2	4
10,000	-4.6	-8	-4	0	2	-2	3	6	8	9	14	16	17	3	7	11	12	0	5	9	11	6	5	3	5
5,000	5.1	-2	-7	-2	1	7	2	6	9	20	15	18	19	11	6	10	12	9	4	9	12	8	7	4	7
LITTLE ROCK TO MEMPHIS																						113 N.MI.			
15,000	-14.7	-11	3	6	8	-8	7	9	11	-1	14	15	16	-4	11	13	14	-6	9	11	12	4	4	2	3
10,000	-4.6	-3	2	5	6	2	7	10	11	9	14	15	16	6	11	13	14	4	8	11	12	4	4	2	4
5,000	5.1	4	-1	3	6	10	5	9	10	19	14	16	17	13	8	11	13	12	7	10	12	6	5	3	5
LITTLE ROCK TO ST. LOUIS																						257 N.MI.			
15,000	-14.7	-13	2	5	6	-9	5	8	10	-1	14	15	16	-5	10	12	13	-7	8	10	12	4	4	2	4
10,000	-4.6	-5	0	3	5	1	5	8	10	9	13	15	16	5	9	12	14	2	7	10	11	5	5	2	4
5,000	5.1	2	-3	1	4	9	4	7	9	19	14	16	17	12	7	10	12	10	5	9	11	7	6	3	5
LITTLE ROCK TO SHREVEPORT																						158 N.MI.			
15,000	-14.7	-10	4	7	8	-7	8	10	11	-0	14	15	16	-4	11	13	14	-5	9	12	13	4	4	2	3
10,000	-4.6	-1	3	6	8	4	8	11	12	10	14	15	16	7	11	13	15	5	9	11	13	4	4	2	3
5,000	5.1	6	1	5	7	12	6	10	12	20	15	17	18	14	8	11	13	13	8	11	13	6	5	3	4
LITTLE ROCK TO SPRINGFIELD, MO.																						161 N.MI.			
15,000	-14.7	-13	2	5	7	-9	6	9	10	-1	14	15	16	-5	10	12	14	-7	8	11	12	4	4	2	3
10,000	-4.6	-4	1	4	6	2	6	9	11	9	14	15	16	5	10	13	14	3	8	10	12	5	4	2	4
5,000	5.1	3	-2	3	5	10	5	8	10	20	15	17	18	13	7	11	13	11	6	10	12	7	6	3	5
LONG BEACH TO LOS ANGELES																						14 N.MI.			
15,000	-14.7	-10	4	8	10	-9	6	8	10	0	15	16	17	-5	10	13	14	-6	9	11	13	5	4	2	4
10,000	-4.6	0	5	8	10	2	6	9	11	11	16	17	18	5	10	13	14	5	9	12	14	5	4	2	4
5,000	5.1	7	2	5	7	11	6	10	11	23	17	19	20	16	11	13	14	14	9	13	15	5	5	3	3
LONG BEACH TO SAN DIEGO																						81 N.MI.			
15,000	-14.7	-10	5	8	10	-9	6	9	10	0	15	16	17	-4	10	13	14	-6	9	12	13	5	4	2	4
10,000	-4.6	0	5	9	10	2	7	10	11	12	16	17	18	6	10	13	14	5	10	12	14	5	4	2	4
5,000	5.1	7	2	6	8	12	7	10	12	23	18	19	20	16	11	13	14	14	9	13	15	5	5	3	3
LOS ANGELES TO ONTARIO																						40 N.MI.			
15,000	-14.7	-10	4	8	10	-9	6	8	10	0	15	16	17	-5	10	13	14	-6	9	11	13	5	4	2	4
10,000	-4.6	0	5	8	10	2	6	9	11	12	16	18	18	5	10	13	14	5	9	12	14	5	4	2	4
5,000	5.1	7	2	5	7	12	6	10	12	23	18	19	20	16	11	13	14	14	9	13	15	5	5	3	3
LOS ANGELES TO PALM SPRINGS																						95 N.MI.			
15,000	-14.7	-10	4	8	10	-9	6	8	10	1	15	16	17	-5	10	13	14	-6	9	11	13	5	4	2	4
10,000	-4.6	0	5	8	10	2	7	10	11	12	16	18	18	6	10	13	14	5	9	12	14	5	4	2	4
5,000	5.1	7	2	5	7	12	7	10	12	23	18	20	21	16	11	13	15	14	9	13	15	5	5	3	3
LOS ANGELES TO PHOENIX																						320 N.MI.			
15,000	-14.7	-10	4	8	10	-9	6	9	10	1	16	17	17	-4	10	13	14	-6	9	12	13	5	4	2	4
10,000	-4.6	-0	5	8	10	3	7	10	12	12	17	18	19	6	10	13	14	5	10	13	14	5	4	2	4
5,000	5.1	7	2	5	7	14	9	12	14	24	19	21	22	17	12	15	16	16	10	14	16	5	5	3	3

## ENROUTE TEMPERATURES AND STANDARD DEVIATION IN DEGREES CELSIUS FOR GREAT CIRCLE AIR ROUTES

HEIGHT IN FEET	ISA TEMP.	ENROUTE				TEMPERATURE				STANDARD DEVIATION																	
		JANUARY				APRIL				JULY				OCTOBER				ANNUAL				JAN	APR	JUL	OCT		
		50	D50	D75	D85	50	D50	D75	D85	50	D50	D75	D85	50	D50	D75	D85	50	D50	D75	D85						
LOS ANGELES TO SACRAMENTO																								309 N.MI.			
15,000	-14.7	-12	3	6	8	-11	4	7	8	-0	14	16	17	-6	9	12	13	-7	8	10	12	5	4	2	4		
10,000	-4.6	-1	3	7	9	0	5	8	10	11	16	17	18	4	9	12	13	3	8	11	13	6	5	2	4		
5,000	5.1	5	-0	4	6	10	5	8	10	22	17	19	20	14	9	12	13	13	8	12	14	5	5	3	4		
LOS ANGELES TO SAN DIEGO																								94 N.MI.			
15,000	-14.7	-10	5	8	10	-9	6	9	10	0	15	16	17	-4	10	13	14	-6	9	12	13	5	4	2	4		
10,000	-4.6	0	5	9	10	2	7	10	11	11	16	17	18	6	10	13	14	5	10	12	14	5	4	2	4		
5,000	5.1	7	2	6	8	12	7	10	12	23	17	19	20	16	11	13	14	14	9	13	15	5	5	3	3		
LOS ANGELES TO SAN FRANCISCO																								295 N.MI.			
15,000	-14.7	-12	3	7	9	-10	4	7	9	-0	15	16	17	-6	9	12	13	-7	8	11	12	5	4	2	4		
10,000	-4.6	-1	4	7	9	0	5	8	10	11	16	17	18	4	9	12	13	4	8	11	13	5	5	2	4		
5,000	5.1	5	0	4	6	10	5	8	10	22	16	18	20	14	9	12	13	13	8	12	14	5	5	3	4		
LOS ANGELES TO SANTA BARBARA																								77 N.MI.			
15,000	-14.7	-10	4	8	9	-9	5	8	9	0	15	16	17	-5	10	12	14	-6	9	11	13	5	4	2	4		
10,000	-4.6	0	5	8	10	2	6	9	11	11	16	17	18	5	10	13	14	5	9	12	14	5	4	2	4		
5,000	5.1	6	1	5	7	11	6	9	11	22	17	19	20	15	10	12	14	14	9	12	14	5	5	3	3		
LOS ANGELES TO TUCSON																								390 N.MI.			
15,000	-14.7	-10	5	8	10	-8	7	9	10	1	16	17	17	-4	11	13	14	-5	9	12	13	5	4	2	3		
10,000	-4.6	0	5	8	10	3	8	11	12	12	17	18	19	6	11	13	15	6	10	13	14	5	4	2	3		
5,000	5.1	7	2	6	8	14	9	12	14	24	19	21	22	18	13	15	16	16	11	14	16	5	5	3	4		
LOUISVILLE TO MEMPHIS																								277 N.MI.			
15,000	-14.7	-13	2	5	7	-9	5	8	9	-1	13	15	15	-5	9	12	13	-7	8	10	11	4	4	2	4		
10,000	-4.6	-4	0	3	5	0	5	8	10	8	13	14	15	5	9	12	13	2	7	10	11	5	4	2	4		
5,000	5.1	2	-3	1	4	8	3	7	9	18	13	15	16	11	6	10	11	10	5	9	10	7	5	3	5		
LOUISVILLE TO NASHVILLE																								131 N.MI.			
15,000	-14.7	-13	2	5	6	-10	5	8	9	-2	13	14	15	-6	9	11	13	-8	7	10	11	5	4	2	4		
10,000	-4.6	-5	0	3	5	-0	4	7	9	8	12	14	15	4	9	11	13	2	6	9	11	5	5	2	4		
5,000	5.1	2	-4	1	3	8	3	6	8	18	13	15	16	11	6	9	11	9	4	8	10	7	5	3	5		
LOUISVILLE TO OWENSBORO																								73 N.MI.			
15,000	-14.7	-14	1	4	6	-10	4	7	9	-2	13	14	15	-6	9	11	13	-8	7	9	11	5	4	2	4		
10,000	-4.6	-6	-1	2	4	-1	4	7	8	8	12	14	15	4	8	11	13	1	6	9	10	5	5	2	4		
5,000	5.1	0	-5	0	3	7	2	6	8	18	13	15	16	10	5	9	11	9	4	8	10	7	6	3	5		
LOUISVILLE TO ST. LOUIS																								220 N.MI.			
15,000	-14.7	-14	0	4	5	-11	4	7	8	-2	13	14	15	-6	8	11	12	-8	6	9	11	5	4	2	4		
10,000	-4.6	-6	-2	2	4	-1	3	7	8	8	12	14	15	4	8	11	13	1	6	9	10	5	5	2	4		
5,000	5.1	-0	-5	-1	2	7	2	6	8	18	13	15	16	10	5	9	11	9	3	8	10	7	6	3	6		
LUBBOCK TO MIDLAND																								105 N.MI.			
15,000	-14.7	-10	4	7	9	-7	8	11	12	1	15	17	17	-3	11	13	14	-5	10	12	13	4	4	2	3		
10,000	-4.6	-1	4	7	9	5	10	12	14	12	16	17	18	7	12	14	15	6	10	13	14	5	4	2	3		
5,000	5.1	7	2	6	9	15	10	13	15	23	18	21	22	16	11	14	16	15	10	14	16	7	5	3	4		
LUBBOCK TO WICHITA FALLS																								166 N.MI.			
15,000	-14.7	-11	3	6	8	-7	8	10	12	0	15	16	17	-4	11	13	14	-5	9	12	13	4	4	2	3		
10,000	-4.6	-2	3	6	8	5	9	12	14	11	16	17	18	7	11	14	15	5	10	12	14	5	4	2	4		
5,000	5.1	6	1	6	8	14	9	12	14	23	18	20	22	16	10	13	15	14	9	14	16	7	6	4	5		
MACON TO SAVANNAH																								134 N.MI.			
15,000	-14.7	-8	6	9	10	-7	8	10	11	-1	14	15	15	-3	11	13	14	-5	10	12	13	3	3	2	3		
10,000	-4.6	0	5	7	9	3	7	10	11	8	13	14	14	6	11	13	14	4	9	11	12	4	3	2	3		
5,000	5.1	7	2	5	7	11	6	8	10	18	13	14	15	13	8	10	11	12	7	10	11	5	4	2	3		
MACON TO WAYCROSS																								107 N.MI.			
15,000	-14.7	-8	7	9	10	-6	8	10	12	-1	14	15	15	-3	12	13	14	-5	10	12	13	3	3	2	3		
10,000	-4.6	1	5	8	9	3	8	10	11	8	13	14	14	7	11	13	14	5	9	11	12	4	3	1	3		
5,000	5.1	8	2	6	7	11	6	9	10	18	13	14	15	13	8	10	11	12	7	10	11	5	4	2	3		
MADISON TO MILWAUKEE																								64 N.MI.			
15,000	-14.7	-20	-5	-1	1	-15	-0	3	5	-4	11	13	14	-10	5	8	10	-12	3	6	8	6	5	3	5		
10,000	-4.6	-12	-7	-3	-1	-5	-1	3	5	6	11	13	14	0	5	9	11	-3	2	6	8	6	5	3	5		
5,000	5.1	-6	-11	-6	-4	3	-3	2	4	16	11	13	15	7	2	7	9	5	-0	5	7	8	7	4	6		
MADISON TO ROCHESTER, MINN.																								145 N.MI.			
15,000	-14.7	-20	-6	-2	0	-15	-0	3	5	-4	11	13	14	-10	5	8	10	-12	2	6	8	6	5	3	5		
10,000	-4.6	-12	-8	-3	-1	-5	-1	3	5	6	11	13	14	0	5	9	11	-3	2	6	8	6	5	3	5		
5,000	5.1	-7	-12	-7	-4	3	-3	2	5	16	11	14	15	7	2	7	9	5	-0	5	8	8	7	4	7		
MANCHESTER TO WORCESTER																								51 N.MI.			
15,000	-14.7	-19	-4	0	2	-16	-2	2	4	-5	10	12	13	-10	5	8	10	-12	2	6	8	6	5	3	5		
10,000	-4.6	-12	-7	-3	0	-7	-3	1	3	5	9	11	12	-0	4	8	10	-4	1	5	7	6	5	3	5		
5,000	5.1	-6	-11	-6	-3	2	-4	0	2	14	9	11	12	7	2	5	7	4	-1	3	5	7	6	3	6		
MARTHAS VINEYARD TO NEW BEDFORD																								22 N.MI.			
15,000	-14.7	-17	-2	1	3	-15	-0	3	5	-4	11	12	13	-9	6	9	11	-11	3	7	9	6	5	3	5		
10,000	-4.6	-10	-5	-1	1	-6	-1	2	4	5	10	12	13	1	5	8	10	-3	2	6	7	6	5	3	5		
5,000	5.1	-4	-9	-4	-2	3	-2	1	3	14	9	11	12	8	3	6	8	5	0	4	6	7	5	3	5		
MEDFORD TO SACRAMENTO																								243 N.MI.			
15,000	-14.7	-15	-0	4	6	-13	2	5	6	-2	13	14	15	-8	6	9	11	-10	5	8	10	6	5	3	5		
10,000	-4.6	-5	-1	3	6	-3	2	5	7	9	14	16	17	1	6	9	11	1	5	9	11	6	5	3	5		
5,000	5.1	2	-3	0	2	8	3	6	8	20	15	17	19	11	6	9	11	10	5	10	12	5	5	4	5		
MEDFORD TO SAN FRANCISCO																								286 N.MI.			
15,000	-14.7	-14	0	4	6	-13	2	5	7	-2	13	14	15	-8	6	10	11	-9	5	9	10	6	4	3	5		
10,000	-4.6	-5	-0	4	6	-3	2	5	7	9	14	16	17	2	6	10	11	1	5	9	11	6	5	3	5		
5,000	5.1	2	-3	1	2	8	2	6	8	20	14	17	18	11	6	9	11	10	5	10	12	5	5	3	5		

\*D--DIFFERENCE BETWEEN INDICATED PER CENT RELIABILITY TEMPERATURE AND INTERNATIONAL STANDARD ATMOSPHERE TEMPERATURE.

## ENROUTE TEMPERATURES AND STANDARD DEVIATION IN DEGREES CELSIUS FOR GREAT CIRCLE AIR ROUTES

HEIGHT IN FEET	ISA TEMP.	ENROUTE TEMPERATURE																				STANDARD DEVIATION			
		JANUARY					APRIL					JULY					OCTOBER					ANNUAL			
		50	D50	D75	D85		50	D50	D75	D85		50	D50	D75	D85		50	D50	D75	D85		JAN	APR	JUL	OCT
MELBOURNE TO MIAMI																									
15,000	-14.7	-4	10	12	13	-4	11	13	13	-1	14	15	15	-1	14	15	16	-2	12	13	14	2	3	1	2
10,000	-4.6	5	9	11	12	5	10	12	13	8	13	14	14	8	13	14	15	7	11	12	13	2	3	1	2
5,000	5.1	11	6	8	9	13	8	10	11	17	12	13	13	15	10	11	12	14	9	11	11	3	3	1	2
MELBOURNE TO ORLANDO																									
15,000	-14.7	-5	9	11	12	-5	10	12	13	-1	14	15	15	-1	13	15	15	-3	12	13	14	3	3	1	2
10,000	-4.6	4	8	10	11	5	9	11	12	8	13	14	14	8	12	14	15	6	11	12	13	3	3	1	2
5,000	5.1	10	5	8	9	13	8	10	11	17	12	13	14	14	9	11	12	14	9	10	11	3	3	1	2
MELBOURNE TO TAMPA																									
15,000	-14.7	-5	10	11	12	-4	10	12	13	-1	14	15	15	-1	13	15	16	-3	12	13	14	3	3	1	2
10,000	-4.6	4	9	10	11	5	10	12	13	8	13	14	14	8	13	14	15	6	11	12	13	3	3	1	2
5,000	5.1	11	5	8	9	13	8	10	11	17	12	13	14	14	9	11	12	14	9	11	11	3	3	1	2
MELBOURNE TO VERO BEACH																									
15,000	-14.7	-5	10	12	13	-4	10	12	13	-1	14	15	15	-1	13	15	16	-3	12	13	14	3	3	1	2
10,000	-4.6	4	9	11	12	5	10	11	12	8	13	14	14	8	12	14	15	6	11	12	13	3	3	1	2
5,000	5.1	11	6	8	9	13	8	10	11	17	12	13	14	14	9	11	12	14	9	10	11	3	3	1	2
MELBOURNE TO WEST PALM BEACH																									
15,000	-14.7	-5	10	12	13	-4	11	12	13	-1	14	15	15	-1	14	15	16	-3	12	13	14	3	3	1	2
10,000	-4.6	4	9	11	12	5	10	12	13	8	13	14	14	8	13	14	15	7	11	12	13	3	3	1	2
5,000	5.1	11	6	8	9	13	8	10	11	17	12	13	14	15	10	11	12	14	9	11	11	3	3	1	2
MEMPHIS TO NASHVILLE																									
15,000	-14.7	-12	3	6	7	-9	6	9	10	-1	14	15	15	-5	10	12	13	-7	8	11	12	4	4	2	3
10,000	-4.6	-3	1	4	6	1	6	9	10	9	13	14	15	5	10	12	14	3	8	10	11	4	4	2	4
5,000	5.1	3	-2	3	5	9	4	7	9	19	13	15	16	12	7	10	12	11	6	9	11	6	5	3	5
MEMPHIS TO NEW ORLEANS																									
15,000	-14.7	-9	5	8	9	-6	8	11	12	-0	14	15	16	-3	12	13	14	-5	10	12	13	4	3	2	3
10,000	-4.6	0	5	7	8	4	8	11	12	9	14	15	15	7	12	14	15	5	10	12	13	4	4	2	3
5,000	5.1	7	1	5	7	11	6	9	11	19	14	15	16	13	8	11	12	12	7	10	12	5	4	2	4
MEMPHIS TO PADUCAH																									
15,000	-14.7	-12	3	5	7	-9	6	9	10	-1	14	15	15	-5	10	12	13	-7	8	10	12	4	4	2	3
10,000	-4.6	-4	1	4	6	1	6	9	10	9	13	14	15	5	10	12	14	3	7	10	11	5	4	2	4
5,000	5.1	3	-2	2	4	9	4	7	9	19	14	15	16	12	7	10	12	10	5	9	11	6	5	3	5
MEMPHIS TO ST. LOUIS																									
15,000	-14.7	-13	2	5	6	-9	5	8	9	-1	13	15	15	-5	9	12	13	-7	7	10	12	4	4	2	4
10,000	-4.6	-5	0	3	5	0	5	8	10	9	13	15	15	5	9	12	13	2	7	10	11	5	5	2	4
5,000	5.1	2	-4	1	3	8	3	7	9	19	14	15	16	11	6	10	12	10	5	9	11	7	6	3	5
MEMPHIS TO SHREVEPORT																									
15,000	-14.7	-10	4	7	8	-7	8	10	11	-1	14	15	16	-4	11	13	14	-5	9	11	13	4	4	2	3
10,000	-4.6	-1	3	6	7	3	8	11	12	9	14	15	16	7	11	13	15	4	9	11	13	4	4	2	3
5,000	5.1	5	0	4	6	11	6	9	11	20	14	16	17	13	8	11	13	12	7	11	12	6	5	3	4
MERCED TO MODESTO																									
15,000	-14.7	-13	2	6	8	-11	3	6	8	-1	14	16	16	-7	8	11	13	-8	7	10	11	6	4	2	4
10,000	-4.6	-2	2	6	8	-1	4	7	9	11	15	17	18	3	8	11	13	3	7	11	13	6	5	2	5
5,000	5.1	4	-1	3	5	9	4	8	10	22	16	19	20	13	8	11	13	12	7	11	13	5	5	3	4
MERIDIAN TO MONROE																									
15,000	-14.7	-9	5	8	9	-6	8	11	12	-0	14	15	16	-3	12	13	14	-5	10	12	13	4	3	2	3
10,000	-4.6	0	5	7	9	4	8	11	12	9	14	15	15	7	12	14	15	5	10	12	13	4	4	2	3
5,000	5.1	7	2	5	7	12	7	9	11	19	14	15	16	13	8	11	12	13	8	10	12	5	4	2	4
MERIDIAN TO MONTGOMERY																									
15,000	-14.7	-9	6	8	9	-6	8	10	12	-1	14	15	16	-3	12	13	14	-5	10	12	13	3	3	2	3
10,000	-4.6	0	5	7	9	3	8	11	12	9	13	14	15	7	11	13	14	5	9	11	12	4	4	2	3
5,000	5.1	7	2	5	7	11	6	9	10	18	13	15	15	13	8	10	12	12	7	10	11	5	4	2	4
MIAMI TO ORLANDO																									
15,000	-14.7	-5	10	12	13	-4	11	12	13	-1	14	15	15	-1	14	15	16	-3	12	13	14	3	3	1	2
10,000	-4.6	5	9	11	12	5	10	12	13	8	13	14	14	8	13	14	15	7	11	12	13	3	3	1	2
5,000	5.1	11	6	8	9	13	8	10	11	17	12	13	14	15	10	11	12	14	9	11	11	3	3	1	2
MIAMI TO ST. PETERSBURG																									
15,000	-14.7	-4	10	12	13	-4	11	13	14	-1	14	15	15	-1	14	15	16	-2	12	13	14	2	3	1	2
10,000	-4.6	5	9	11	12	6	10	12	13	9	13	14	14	8	13	14	15	7	11	12	13	2	3	1	2
5,000	5.1	11	6	8	9	14	8	10	11	17	12	13	14	15	10	11	12	14	9	11	12	3	3	1	2

## ENROUTE TEMPERATURES AND STANDARD DEVIATION IN DEGREES CELSIUS FOR GREAT CIRCLE AIR ROUTES

FLIGHT IN FEET	ISA TEMP.	ENROUTE TEMPERATURE												STANDARD DEVIATION			
		JANUARY			APRIL			JULY			OCTOBER			ANNUAL			JAN APR JUL OCT
		50 D50 D75 D85			50 D50 D75 D85			50 D50 D75 D85			50 D50 D75 D85			50 D50 D75 D85			
MILWAUKEE TO MINNEAPOLIS																	257 N.MI.
15,000	-14.7	-21	-6	-2	0	-15	-1	3	5	-4	11	13	14	-13	2	6	8
10,000	-4.6	-13	-8	-4	-1	-6	-1	3	5	6	10	13	14	-3	1	6	8
5,000	5.1	-7	-12	-7	-4	2	-3	2	4	16	11	14	15	5	-1	5	7
MILWAUKEE TO MUSKOGON																	74 N.MI.
15,000	-14.7	-20	-5	-1	1	-15	-0	3	5	-4	11	13	14	-12	3	6	8
10,000	-4.6	-12	-7	-3	-1	-6	-1	3	5	6	10	12	13	-3	2	6	8
5,000	5.1	-6	-11	-6	-4	2	-3	2	4	16	11	13	14	5	-0	4	7
MILWAUKEE TO TOLEDO																	200 N.MI.
15,000	-14.7	-19	-4	-0	2	-14	0	4	5	-4	11	13	14	-12	3	7	9
10,000	-4.6	-11	-6	-2	0	-5	-0	3	5	6	10	12	14	-2	2	6	8
5,000	5.1	-5	-10	-5	-2	3	-2	2	5	16	11	13	14	5	0	5	7
MINNEAPOLIS TO OMAHA																	288 N.MI.
15,000	-14.7	-20	-5	-1	1	-14	1	4	6	-3	12	14	15	-11	3	7	9
10,000	-4.6	-11	-6	-2	0	-4	1	4	6	8	12	14	16	-2	3	7	9
5,000	5.1	-5	-10	-5	-2	4	-1	4	7	18	13	16	18	7	2	7	10
MINNEAPOLIS TO ROCHESTER, MINN.																	66 N.MI.
15,000	-14.7	-21	-7	-3	0	-15	-1	3	4	-4	11	13	14	-13	2	6	8
10,000	-4.6	-13	-8	-4	-1	-6	-1	3	5	6	11	13	14	-3	1	6	8
5,000	5.1	-7	-12	-7	-4	2	-3	2	5	17	12	14	16	5	-0	5	8
MINNEAPOLIS TO SIOUX FALLS																	171 N.MI.
15,000	-14.7	-21	-7	-2	0	-15	-0	3	5	-4	11	13	14	-12	2	6	8
10,000	-4.6	-12	-8	-3	-1	-5	-1	3	5	7	12	14	15	-3	2	6	9
5,000	5.1	-7	-12	-6	-3	3	-2	3	6	18	12	15	17	6	0	6	9
MINNEAPOLIS TO WINNIPEG																	342 N.MI.
15,000	-14.7	-25	-10	-6	-4	-17	-2	1	3	-6	9	11	13	-15	-0	4	6
10,000	-4.6	-17	-12	-7	-4	-8	-3	1	3	4	9	12	13	-6	-1	4	6
5,000	5.1	-10	-15	-10	-7	0	-5	0	3	15	10	13	15	3	-2	3	6
MISSOULA TO SPOKANE																	151 N.MI.
15,000	-14.7	-22	-8	-3	0	-16	-1	2	4	-5	9	12	13	-14	1	5	7
10,000	-4.6	-13	-8	-3	0	-6	-2	2	4	6	11	13	14	-4	1	5	8
5,000	5.1	-5	-10	-7	-6	4	-1	3	5	18	13	16	18	8	3	7	9
MOBILE TO MONTGOMERY																	135 N.MI.
15,000	-14.7	-8	7	9	10	-6	9	11	12	-1	14	15	16	-4	10	12	13
10,000	-4.6	1	6	8	9	4	9	11	12	9	13	14	15	5	10	12	13
5,000	5.1	8	3	6	7	12	7	9	11	18	13	15	15	13	8	10	12
MOBILE TO NEW ORLEANS																	112 N.MI.
15,000	-14.7	-7	7	9	10	-5	10	12	13	-0	14	15	16	-4	11	13	14
10,000	-4.6	2	7	9	10	5	10	12	13	9	14	15	15	6	11	12	13
5,000	5.1	9	4	6	8	13	8	10	11	18	13	15	15	14	9	11	12
MOBILE TO PENSACOLA																	55 N.MI.
15,000	-14.7	-7	7	9	10	-5	9	11	12	-0	14	15	16	-4	11	13	14
10,000	-4.6	2	7	9	10	5	9	11	13	9	14	15	15	6	10	12	13
5,000	5.1	9	4	6	8	12	7	10	11	18	13	14	15	14	9	11	12
MODESTO TO STOCKTON																	21 N.MI.
15,000	-14.7	-13	2	6	8	-12	3	6	8	-1	14	15	16	-7	8	11	12
10,000	-4.6	-3	2	6	8	-1	3	7	8	11	15	17	18	3	8	11	12
5,000	5.1	4	-1	2	4	9	4	7	9	21	16	18	20	13	8	11	12
MONCTON TO MONTREAL																	376 N.MI.
15,000	-14.7	-22	-8	-3	-1	-19	-4	-1	1	-7	8	10	12	-12	3	6	8
10,000	-4.6	-16	-11	-6	-3	-10	-6	-2	0	3	7	9	11	-3	2	6	8
5,000	5.1	-10	-15	-9	-7	-1	-6	-2	0	12	7	9	10	4	-1	3	5
MONCTON TO ST. JOHN																	70 N.MI.
15,000	-14.7	-22	-7	-3	0	-19	-4	-0	2	-7	8	10	12	-12	3	6	8
10,000	-4.6	-15	-10	-5	-3	-9	-5	-1	1	3	7	9	11	-3	2	6	8
5,000	5.1	-9	-14	-9	-6	-0	-5	-2	0	12	7	9	10	4	-1	3	5
MONROE TO SHREVEPORT																	90 N.MI.
15,000	-14.7	-10	5	8	9	-6	8	11	12	-0	15	16	16	-3	12	13	15
10,000	-4.6	-0	4	7	9	4	9	11	13	10	14	15	16	7	12	14	15
5,000	5.1	7	2	5	7	12	7	10	12	20	15	16	17	14	9	11	13
MONTEREY TO SALINAS																	13 N.MI.
15,000	-14.7	-12	3	6	8	-11	4	7	8	-1	14	16	16	-6	8	11	13
10,000	-4.6	-2	3	7	9	-1	4	7	9	11	15	17	18	4	8	11	13
5,000	5.1	5	-0	3	5	9	4	7	9	21	16	18	19	13	8	11	12
MONTEREY TO SAN FRANCISCO																	68 N.MI.
15,000	-14.7	-12	2	6	8	-11	3	6	8	-1	14	15	16	-7	8	11	13
10,000	-4.6	-2	3	6	8	-1	4	7	9	10	15	17	17	3	8	11	13
5,000	5.1	4	-1	3	5	9	4	7	9	20	15	18	19	13	8	10	12
MONTEREY TO SANTA BARBARA																	162 N.MI.
15,000	-14.7	-11	3	7	9	-10	4	7	9	-0	15	16	17	-6	9	12	13
10,000	-4.6	-1	4	8	10	0	5	8	10	11	15	17	18	4	9	12	14
5,000	5.1	6	1	4	6	10	4	8	10	21	16	18	19	14	9	11	13
MONTGOMERY TO PENSACOLA																	117 N.MI.
15,000	-14.7	-8	7	9	10	-6	9	11	12	-1	14	15	16	-3	12	14	15
10,000	-4.6	1	6	8	9	4	9	11	12	9	13	14	15	7	12	14	15
5,000	5.1	8	3	6	7	12	7	9	11	18	13	14	15	13	8	11	12

\*D--DIFFERENCE BETWEEN INDICATED PER CENT RELIABILITY TEMPERATURE AND INTERNATIONAL STANDARD ATMOSPHERE TEMPERATURE.



## ENROUTE TEMPERATURES AND STANDARD DEVIATION IN DEGREES CELSIUS FOR GREAT CIRCLE AIR ROUTES

\*D--DIFFERENCE BETWEEN INDICATED PER CENT RELIABILITY TEMPERATURE AND INTERNATIONAL STANDARD ATMOSPHERE TEMPERATURE.

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\*D--DIFFERENCE BETWEEN INDICATED PER CENT RELIABILITY TEMPERATURE AND INTERNATIONAL STANDARD ATMOSPHERE TEMPERATURE.

## ENROUTE TEMPERATURES AND STANDARD DEVIATION IN DEGREES CELSIUS FOR GREAT CIRCLE AIR ROUTES

HEIGHT IN FEET	ISA TEMP.	ENROUTE TEMPERATURE												STANDARD DEVIATION													
		JANUARY 50 D50 D75 D85				APRIL 50 D50 D75 D85				JULY 50 D50 D75 D85				OCTOBER 50 D50 D75 D85				ANNUAL 50 D50 D75 D85				JAN	APR	JUL	OCT		
PHILADELPHIA TO SCRANTON																											
15,000	-14.7	-17	-2	2	4	-14	1	4	6	-3	11	13	14	-8	7	10	11	-10	4	8	9	5	5	99 N.MI.			
10,000	-4.6	-9	-4	-0	2	-5	-0	3	5	6	10	12	13	1	6	9	11	-2	3	6	8	6	5	3	4		
5,000	5.1	-3	-8	-3	-0	4	-1	3	5	15	10	12	13	8	3	7	9	6	1	5	7	7	6	2	5		
PHILADELPHIA TO SYRACUSE																											
15,000	-14.7	-18	-3	1	3	-15	0	3	5	-4	11	13	14	-9	6	9	11	-11	3	7	9	6	5	198 N.MI.			
10,000	-4.6	-10	-5	-1	1	-6	-1	2	4	5	10	12	13	1	5	9	10	-2	2	6	8	6	5	3	5		
5,000	5.1	-4	-9	-4	-1	3	-2	2	4	15	10	12	13	8	2	6	8	5	0	4	7	7	6	3	6		
PHILADELPHIA TO WASHINGTON, D.C.																											
15,000	-14.7	-15	-0	3	5	-12	2	5	7	-3	12	13	14	-7	7	10	12	-9	5	8	10	5	4	104 N.MI.			
10,000	-4.6	-7	-3	1	3	-3	1	4	6	6	11	13	13	2	7	10	11	-0	4	7	9	6	5	2	4		
5,000	5.1	-1	-6	-1	1	5	0	4	6	16	11	13	14	9	4	7	9	7	2	6	8	7	6	3	5		
PHILADELPHIA TO WILLIAMSPORT																											
15,000	-14.7	-16	-2	2	4	-13	1	4	6	-3	11	13	14	-8	7	10	11	-10	4	8	9	5	5	112 N.MI.			
10,000	-4.6	-9	-4	-0	2	-5	0	3	5	6	10	12	13	1	6	9	11	-1	3	6	8	6	5	2	5		
5,000	5.1	-3	-8	-3	-0	4	-1	3	5	15	10	12	13	8	3	7	9	6	1	5	7	7	6	3	5		
PHILADELPHIA TO YOUNGSTOWN																											
15,000	-14.7	-17	-2	2	4	-13	1	4	6	-3	11	13	14	-8	7	10	11	-10	4	8	9	6	5	262 N.MI.			
10,000	-4.6	-9	-4	-0	2	-4	0	4	5	6	11	12	13	2	6	9	11	-1	3	6	8	6	5	2	5		
5,000	5.1	-3	-8	-3	0	4	-1	3	5	15	10	12	14	8	3	7	9	6	1	5	7	8	6	3	6		
PHOENIX TO SAN DIEGO																											
15,000	-14.7	-10	5	8	10	-8	7	9	10	1	16	17	17	-4	11	13	14	-5	9	12	13	5	4	263 N.MI.			
10,000	-4.6	0	5	8	10	3	8	11	12	12	17	18	19	6	11	13	15	6	10	13	14	5	4	2	4		
5,000	5.1	7	2	6	8	14	9	12	14	24	19	21	22	18	13	15	16	16	11	14	16	5	5	3	4		
PHOENIX TO TUCSON																											
15,000	-14.7	-9	5	9	11	-8	7	10	11	1	16	17	18	-4	11	13	14	-5	10	12	14	5	4	96 N.MI.			
10,000	-4.6	-0	4	8	10	4	9	12	13	13	18	19	20	7	11	14	15	6	11	13	15	5	4	2	3</		

\*D--DIFFERENCE BETWEEN INDICATED PER CENT RELIABILITY TEMPERATURE AND INTERNATIONAL STANDARD ATMOSPHERE TEMPERATURE.



## ENROUTE TEMPERATURES AND STANDARD DEVIATION IN DEGREES CELSIUS FOR GREAT CIRCLE AIR ROUTES

HEIGHT IN FEET	ISA TEMP.	ENROUTE TEMPERATURE												STANDARD DEVIATION			
		JANUARY			APRIL			JULY			OCTOBER			ANNUAL			JAN APR JUL OCT
		50 D50 D75 D85	50 D50 D75 D85	50 D50 D75 D85	50 D50 D75 D85	50 D50 D75 D85	50 D50 D75 D85	50 D50 D75 D85	50 D50 D75 D85	50 D50 D75 D85	50 D50 D75 D85	50 D50 D75 D85	50 D50 D75 D85	50 D50 D75 D85	50 D50 D75 D85	50 D50 D75 D85	50 D50 D75 D85
RENO TO SACRAMENTO																	93 N.MI.
15,000	-14.7	-14	1	5	7	-12	3	5	7	-1	14	15	16	-8	7	10	12
10,000	-4.6	-4	1	4	7	-2	3	6	8	11	15	17	18	3	7	10	12
5,000	5.1	3	-2	1	3	9	4	8	10	22	17	19	20	13	8	11	13
RENO TO SALT LAKE CITY																	366 N.MI.
15,000	-14.7	-16	-1	3	5	-13	2	5	7	-0	14	16	17	-8	7	10	12
10,000	-4.6	-6	-2	2	5	-2	3	6	8	12	17	18	19	2	7	10	12
5,000	5.1	1	-4	-0	2	10	5	9	11	25	20	22	23	15	8	12	14
RENO TO SAN FRANCISCO																	166 N.MI.
15,000	-14.7	-14	1	5	7	-12	3	6	7	-1	14	15	16	-7	7	10	12
10,000	-4.6	-4	1	5	7	-2	3	6	8	11	15	17	18	3	7	11	12
5,000	5.1	3	-2	2	4	9	4	7	9	21	16	19	20	13	8	11	12
RICHMOND TO WASHINGTON, D.C.																	82 N.MI.
15,000	-14.7	-14	1	4	6	-11	3	6	8	-3	12	14	14	-7	8	11	12
10,000	-4.6	-6	-1	2	4	-2	2	5	7	7	11	13	13	3	7	10	12
5,000	5.1	1	-4	0	3	6	1	5	7	16	11	13	14	10	5	8	10
ROANOKE TO WASHINGTON, D.C.																	166 N.MI.
15,000	-14.7	-14	1	4	6	-11	4	6	8	-3	12	14	14	-7	8	11	12
10,000	-4.6	-6	-1	2	4	-2	3	6	7	7	11	13	14	3	8	10	12
5,000	5.1	1	-4	0	3	6	1	5	7	16	11	13	14	10	5	8	10
ROANOKE TO WINSTON-SALEM																	72 N.MI.
15,000	-14.7	-12	2	5	7	-10	5	7	9	-2	12	14	15	-6	9	11	13
10,000	-4.6	-4	0	4	5	-1	4	7	8	7	12	13	14	4	8	11	12
5,000	5.1	3	-2	2	4	8	3	6	8	17	12	14	15	11	5	9	10
ROCHESTER, MINN. TO WATERLOO																	81 N.MI.
15,000	-14.7	-20	-5	-1	1	-14	0	4	5	-3	11	13	14	-9	5	9	10
10,000	-4.6	-12	-7	-3	-0	-5	-0	4	6	7	11	13	15	1	5	9	11
5,000	5.1	-6	-11	-6	-3	3	-2	3	5	17	12	15	16	8	3	7	10
ROCHESTER, N.Y. TO SYRACUSE																	68 N.MI.
15,000	-14.7	-20	-5	-1	1	-16	-2	2	4	-5	10	12	13	-10	5	8	10
10,000	-4.6	-12	-8	-3	-1	-7	-3	1	3	4	9	11	12	-0	4	8	10
5,000	5.1	-6	-11	-6	-4	1	-4	0	3	14	9	11	12	6	1	5	7
ROCHESTER, N.Y. TO WASHINGTON, D.C.																	258 N.MI.
15,000	-14.7	-17	-2	1	3	-14	1	4	6	-4	11	13	14	-8	6	9	11
10,000	-4.6	-9	-5	-1	1	-5	-0	3	5	6	10	12	13	1	6	9	11
5,000	5.1	-3	-8	-3	-1	4	-1	2	5	15	10	12	13	8	3	6	9
ROUYN-NORANDA TO VAL-DOR																	53 N.MI.
15,000	-14.7	-27	-12	-7	-5	-21	-6	-2	-0	-8	7	9	11	-14	0	5	7
10,000	-4.6	-19	-15	-10	-7	-12	-7	-3	-1	1	5	8	9	-5	-0	4	6
5,000	5.1	-13	-18	-13	-10	-3	-8	-4	-2	10	5	7	9	0	-5	-0	2
SACRAMENTO TO SAN FRANCISCO																	73 N.MI.
15,000	-14.7	-13	2	5	7	-12	3	6	7	-1	14	15	16	-7	8	11	12
10,000	-4.6	-3	2	5	7	-1	3	6	8	10	15	17	18	3	7	11	12
5,000	5.1	4	-1	2	4	9	3	7	9	21	16	18	19	13	8	10	12
SACRAMENTO TO STOCKTON																	37 N.MI.
15,000	-14.7	-13	2	5	7	-12	3	6	7	-1	14	15	16	-7	8	11	12
10,000	-4.6	-3	1	5	7	-1	3	6	8	10	15	17	18	3	7	11	12
5,000	5.1	4	-2	2	4	9	4	7	9	21	16	18	20	13	8	11	12
SAGUENAY TO SEVEN ISLANDS																	207 N.MI.
15,000	-14.7	-28	-13	-8	-6	-22	-7	-4	-2	-9	6	9	10	-16	-1	3	5
10,000	-4.6	-21	-16	-10	-7	-13	-9	-5	-3	-0	5	7	9	-6	-2	3	5
5,000	5.1	-13	-19	-12	-9	-5	-10	-6	-4	9	4	6	7	-0	-5	-1	2
ST. JOHN TO YARMOUTH																	89 N.MI.
15,000	-14.7	-20	-6	-1	1	-18	-3	0	2	-6	9	11	12	-11	4	7	9
10,000	-4.6	-14	-9	-4	-2	-9	-4	0	1	3	8	10	11	-2	3	6	8
5,000	5.1	-8	-13	-8	-5	1	-5	-1	1	13	8	10	11	5	0	4	6
ST. JOHNS TO SYDNEY																	312 N.MI.
15,000	-14.7	-21	-7	-2	1	-18	-3	1	2	-7	8	10	11	-12	3	6	8
10,000	-4.6	-14	-10	-4	-2	-8	-4	0	2	2	7	9	10	-3	1	5	7
5,000	5.1	-6	-12	-6	-3	1	-4	-0	2	11	6	8	10	4	-1	3	5
ST. LOUIS TO SPRINGFIELD, MO.																	169 N.MI.
15,000	-14.7	-14	0	4	5	-10	5	7	9	-1	13	15	16	-6	9	11	13
10,000	-4.6	-6	-1	2	4	-0	4	8	9	9	13	15	16	4	9	12	13
5,000	5.1	0	-5	0	3	8	3	7	9	19	14	16	17	11	6	10	12
ST. LOUIS TO TULSA																	304 N.MI.
15,000	-14.7	-14	1	4	6	-10	5	8	9	-1	14	15	16	-6	9	12	13
10,000	-4.6	-5	-1	3	5	1	5	8	10	9	14	15	16	4	9	12	13
5,000	5.1	1	-4	1	4	9	3	8	10	20	15	17	18	12	7	10	12
SALINAS TO SAN FRANCISCO																	69 N.MI.
15,000	-14.7	-12	2	6	8	-11	3	6	8	-1	14	15	16	-7	8	11	13
10,000	-4.6	-2	3	6	8	-1	4	7	9	10	15	17	18	3	8	11	13
5,000	5.1	4	-1	3	5	9	4	7	9	20	15	18	19	13	8	10	12
SALINAS TO SANTA BARBARA																	159 N.MI.
15,000	-14.7	-11	3	7	9	-10	4	7	9	-0	15	16	17	-6	9	12	13
10,000	-4.6	-1	4	8	10	0	5	8	10	11	15	17	18	4	9	12	14
5,000	5.1	6	0	4	6	10	4	8	10	21	16	18	19	14	9	11	13

\*D--DIFFERENCE BETWEEN INDICATED PER CENT RELIABILITY TEMPERATURE AND INTERNATIONAL STANDARD ATMOSPHERE TEMPERATURE.

## ENROUTE TEMPERATURES AND STANDARD DEVIATION IN DEGREES CELSIUS FOR GREAT CIRCLE AIR ROUTES

HEIGHT IN FEET	ISA TEMP.	ENROUTE TEMPERATURE												STANDARD DEVIATION								
		JANUARY			APRIL			JULY			OCTOBER			ANNUAL			JAN	APR	JUL	OCT		
		50 D50 D75 D85			50 D50 D75 D85			50 D50 D75 D85			50 D50 D75 D85			50 D50 D75 D85			50 D50 D75 D85					
SAN DIEGO TO SAN FRANCISCO																						
15,000	-14.7	-11	4	7	9	-10	5	7	9	-0	15	16	17	-5	9	12	13	-7	8	11	12	5 4 2 4
10,000	-4.6	-1	4	8	10	1	5	8	10	11	16	17	18	5	9	12	14	4	9	12	13	5 5 2 4
5,000	5.1	6	1	4	6	10	5	9	10	22	17	19	20	15	10	12	13	13	8	12	14	5 5 3 4
SAN FRANCISCO TO STOCKTON																						
15,000	-14.7	-13	2	6	8	-12	3	6	8	-1	14	15	16	-7	8	11	12	-8	7	10	11	5 4 2 4
10,000	-4.6	-3	2	6	8	-1	3	7	8	10	15	17	18	3	8	11	13	2	7	10	12	6 5 3 5
5,000	5.1	4	-1	2	4	9	4	7	9	21	16	18	19	13	8	10	12	12	6	11	13	5 5 3 4
SARASOTA TO TAMPA																						
15,000	-14.7	-5	10	11	12	-4	11	12	13	-1	14	15	15	-1	13	15	16	-3	12	13	14	3 3 1 2
10,000	-4.6	4	9	11	12	5	10	12	13	9	13	14	14	8	13	14	15	7	11	12	13	3 3 1 2
5,000	5.1	11	6	8	9	13	8	10	11	18	12	13	14	15	10	11	12	14	9	11	12	3 3 1 2
SARASOTA TO WEST PALM BEACH																						
15,000	-14.7	-5	10	12	13	-4	11	13	13	-1	14	15	15	-1	14	15	16	-3	12	13	14	3 3 1 2
10,000	-4.6	5	9	11	12	6	10	12	13	9	13	14	14	8	13	14	15	7	11	12	13	3 3 1 2
5,000	5.1	11	6	8	9	13	8	10	11	17	12	13	14	15	10	11	12	14	9	11	11	3 3 1 2
SASKATOON TO WINNIPEG																						
15,000	-14.7	-28	-14	-9	-6	-19	-4	-0	2	-7	7	10	11	-15	-0	3	5	-17	-3	2	4	7 5 4 6
10,000	-4.6	-19	-15	-9	-6	-9	-5	-1	1	3	7	10	11	-6	-1	3	6	-8	-3	2	4	8 6 4 6
5,000	5.1	-12	-17	-12	-9	-1	-6	-1	1	13	8	11	13	4	-1	4	6	1	-4	2	5	7 7 5 7
SAULT STE. MARIE TO TORONTO																						
15,000	-14.7	-23	-8	-3	-1	-18	-3	1	2	-6	9	11	12	-11	3	7	9	-14	0	4	7	7 5 3 5
10,000	-4.6	-15	-10	-6	-3	-8	-4	-0	2	3	8	10	12	-2	3	7	9	-5	-1	3	6	7 5 3 6
5,000	5.1	-9	-14	-9	-6	-0	-5	-1	1	13	8	11	12	5	-0	4	6	2	-3	2	5	7 6 4 6
SCRANTON TO SYRACUSE																						
15,000	-14.7	-19	-4	0	2	-15	-1	3	4	-4	10	12	13	-9	5	9	10	-12	3	6	8	6 5 3 5
10,000	-4.6	-11	-7	-2	0	-6	-2	2	3	5	9	11	12	0	5	8	10	-3	1	5	7	6 5 3 5
5,000	5.1	-5	-10	-5	-3	2	-3	1	3	14	9	11	13	7	2	6	8	5	-0	4	6	7 6 3 6
SCRANTON TO WILLIAMSPORT																						
15,000	-14.7	-18	-3	1	3	-14	0	4	5	-4	11	13	14	-9	6	9	11	-11	4	7	9	6 5 3 5
10,000	-4.6	-10	-5	-1	1	-5	-1	3	4	5	10	12	13	1	5	9	10	-2	2	6	8	6 5 3 5
5,000	5.1	-4	-9	-4	-1	3	-2	2	4	15	10	12	13	8	3	6	8	5	0	5	7	7 6 3 6
SEATTLE TO SPOKANE																						
15,000	-14.7	-21	-6	-2	1	-17	-2	1	3	-6	8	11	12	-13	2	6	7	-14	1	4	7	7 5 3 5
10,000	-4.6	-12	-7	-2	0	-7	-2	1	3	4	9	11	13	-3	2	5	7	-4	0	4	7	7 5 3 5
5,000	5.1	-4	-9	-5	-3	3	-2	1	3	15	10	13	15	7	2	6	8	5	0	5	8	5 5 3 6
SEATTLE TO VANCOUVER																						
15,000	-14.7	-21	-6	-2	1	-17	-2	1	3	-7	8	10	11	-13	1	5	7	-15	0	4	6	7 5 3 5
10,000	-4.6	-12	-7	-3	0	-8	-3	0	2	3	8	10	11	-4	1	4	6	-5	-0	4	6	7 5 3 5
5,000	5.1	-4	-9	-5	-3	1	-4	-1	1	13	8	11	12	6	1	4	6	4	-1	4	6	5 5 4 5
SEATTLE TO VICTORIA																						
15,000	-14.7	-21	-6	-2	1	-17	-2	1	3	-7	8	10	11	-13	2	5	7	-15	0	4	6	7 5 3 5
10,000	-4.6	-12	-7	-2	0	-7	-3	0	2	3	8	10	11	-3	1	5	7	-5	-0	4	6	7 5 3 5
5,000	5.1	-4	-9	-5	-3	1	-4	-0	1	13	8	11	13	6	1	4	6	4	-1	4	6	5 5 4 5
SEATTLE TO YAKIMA																						
15,000	-14.7	-20	-6	-1	2	-16	-2	2	3	-6	9	11	12	-12	2	6	8	-14	1	5	7	7 5 3 5
10,000	-4.6	-11	-7	-2	1	-7	-2	1	3	4	9	11	13	-3	2	6	7	-4	1	5	7	7 5 3 5
5,000	5.1	-3	-8	-5	-3	3	-2	1	3	15	10	13	15	7	2	6	7	6	0	5	8	5 5 5 5
SHREVEPORT TO TEXARKANA																						
15,000	-14.7	-10	5	7	9	-7	8	10	12	-0	15	16	16	-3	11	13	14	-5	10	12	13	4 3 2 3
10,000	-4.6	-1	4	7	8	4	9	11	13	10	14	16	16	7	11	14	15	5	10	12	13	4 4 2 3
5,000	5.1	6	1	5	7	12	7	10	12	20	15	17	18	14	9	12	13	13	8	11	13	6 5 3 4
SHREVEPORT TO TULSA																						
15,000	-14.7	-11	3	6	8	-7	7	10	11	-0	14	16	16	-4	11	13	14	-6	9	11	13	4 4 2 3
10,000	-4.6	-2	2	5	7	3	8	11	12	10	15	16	16	6	11	13	14	4	9	11	13	4 4 2 3
5,000	5.1	5	-0	4	7	12	6	10	12	21	16	18	19	14	9	12	13	13	8	12	13	7 5 3 5
SIOUX CITY TO SIOUX FALLS																						
15,000	-14.7	-20	-5	-1	1	-14	1	4	6	-3	12	14	15	-9	6	9	11	-11	3	7	9	6 5 3 5
10,000	-4.6	-11	-6	-2	1	-4	1	5	7	8	13	15	16	1	6	9	11	-1	3	7	10	6 5 3 5
5,000	5.1	-5	-10	-4	-1	5	-0	5	7	19	14	17	18	9	4	9	11	7	2	7	10	8 7 4 7
SIOUX CITY TO WATERLOO																						
15,000	-14.7	-19	-5	-1	1	-14	1	4	6	-3	12	14	15	-9	6	9	11	-11	4	7	9	6 5 3 5
10,000	-4.6	-10	-6	-2	1	-4	1	5	7	8	12	14	15	1	6	9	11	-1	3	7	9	6 5 3 5
5,000	5.1	-5	-10	-4	-1	5	-1	4	7	18	13	16	17	9	4	8	11	7	2	7	10	8 7 4 7
SMITHERS TO TERRACE																						
15,000	-14.7	-24	-9	-5	-2	-20	-6	-3	-1	-11	4	7	8	-17	-2	1	3	-18	-3	1	3	7 5 4 5
10,000	-4.6	-13	-9	-4	-2	-11	-6	-3	-2	-1	4	6	7	-7	-3	1	2	-8	-3	0	2	7 4 4 5
5,000	5.1	-8	-13	-9	-6	-4	-9	-6	-5	8	3	5	7	0	-5	-2	-0	-1	-6	-1	1	6 4 4 4
SPOKANE TO YAKIMA																						
15,000	-14.7	-21	-6	-2	1	-16	-2	2	3	-6	9	11	12	-12	2	6	8	-14	1	5	7	7 5 3 5
10,000	-4.6	-12	-7	-2	0	-7	-2	1	3	5	10	12	13	-2	2	6	8	-4	1	5	7	7 5 3 5
5,000	5.1	-4	-9	-5	-3	4	-2	2	4	17	12	15	16	7	2	6	8	6	1	6	9	5 5 5 6
STEPHENVILLE TO SYDNEY																						
15,000	-14.7	-23	-8	-4	-1	-19	-4	-0	2	-7	7	10	11	-13	2	6	8	-15	-1	3	6	7 5 4 5
10,000	-4.6	-16	-11	-6	-3	-9	-4	-1	1	2	6	9	10	-4	0	4	6	-7	-2	2	4	8 5 3 6
5,000	5.1	-8	-13	-8	-5	0	-5	-1	1	11	6	8	9	4	-1	2	5	-2	-3	1	3	8 5 3 6

\*D--DIFFERENCE BETWEEN INDICATED PER CENT RELIABILITY TEMPERATURE AND INTERNATIONAL STANDARD ATMOSPHERE TEMPERATURE.

## ENROUTE TEMPERATURES AND STANDARD DEVIATION IN DEGREES CELSIUS FOR GREAT CIRCLE AIR ROUTES

HEIGHT IN FEET	ISA TEMP.	ENROUTE TEMPERATURE												STANDARD DEVIATION			
		JANUARY			APRIL			JULY			OCTOBER			ANNUAL			JAN APR JUL OCT
		50 D50 D75 D85	50 D50 D75 D85	50 D50 D75 D85	50 D50 D75 D85	50 D50 D75 D85	50 D50 D75 D85	50 D50 D75 D85	50 D50 D75 D85	50 D50 D75 D85	50 D50 D75 D85	50 D50 D75 D85	50 D50 D75 D85				
SUDBURY TO TIMMINS																	
15,000	-14.7	-26	-11	-7	-4	-20	-5	-2	0	-8	7	10	11	-14	1	5	7
10,000	-4.6	-19	-14	-9	-6	-11	-6	-3	-1	1	6	9	10	-4	1	5	7
5,000	5.1	-12	-17	-12	-9	-2	-8	-3	-1	11	6	8	10	1	-4	1	3
SUDBURY TO TORONTO																	
15,000	-14.7	-23	-8	-3	-1	-18	-3	0	2	-6	9	11	12	-12	3	7	9
10,000	-4.6	-15	-11	-6	-4	-9	-4	-1	1	3	8	10	11	-2	3	7	9
5,000	5.1	-9	-14	-9	-6	-1	-6	-1	1	13	8	10	12	5	-1	4	6
SYRACUSE TO WASHINGTON, D.C.																	
15,000	-14.7	-17	-2	1	3	-14	1	4	6	-4	11	13	14	-8	6	9	11
10,000	-4.6	-9	-5	-1	1	-5	-0	3	5	6	10	12	13	1	6	9	11
5,000	5.1	-3	-8	-3	-1	4	-2	2	4	15	10	12	13	8	3	6	8
TALLAHASSEE TO TAMPA																	
15,000	-14.7	-6	9	11	12	-5	10	12	13	-1	14	15	15	-2	13	14	15
10,000	-4.6	3	8	10	11	5	9	11	12	9	13	14	14	8	12	14	15
5,000	5.1	10	5	7	9	13	8	10	11	18	13	14	14	14	9	11	12
TEMPLE TO WACO																	
15,000	-14.7	-9	6	8	10	-6	9	11	12	0	15	16	17	-3	12	14	15
10,000	-4.6	1	5	8	9	6	10	13	14	11	15	16	17	8	12	14	15
5,000	5.1	8	3	7	9	14	9	12	14	21	16	18	19	15	10	13	14
TERRACE TO VANCOUVER																	
15,000	-14.7	-23	-8	-3	-1	-19	-4	-1	1	-9	5	8	9	-16	-1	3	5
10,000	-4.6	-13	-9	-4	-1	-9	-5	-2	-0	1	5	8	9	-6	-1	2	4
5,000	5.1	-6	-11	-7	-5	-2	-7	-4	-3	9	4	7	9	3	-2	1	2
TOLEDO TO WASHINGTON, D.C.																	
15,000	-14.7	-16	-2	2	4	-13	2	5	7	-3	12	13	14	-8	7	10	11
10,000	-4.6	-8	-4	0	2	-4	1	4	6	6	11	12	13	2	6	10	11
5,000	5.1	-2	-7	-2	1	5	-0	4	6	16	11	13	14	8	3	7	9
TORONTO TO WASHINGTON, D.C.																	
15,000	-14.7	-18	-3	1	3	-14	1	4	5	-4	11	13	14	-9	6	9	11
10,000	-4.6	-10	-5	-1	1	-5	-1	3	5	5	10	12	13	1	6	9	11
5,000	5.1	-4	-9	-4	-1	3	-2	2	4	15	10	12	13	8	3	6	8
TORONTO TO WINDSOR																	
15,000	-14.7	-22	-8	-3	-1	-18	-3	0	2	-6	9	11	12	-11	3	7	9
10,000	-4.6	-15	-10	-6	-3	-9	-4	-0	2	3	8	10	12	-2	3	7	9
5,000	5.1	-9	-14	-9	-6	-0	-5	-1	1	13	8	11	12	5	-0	4	6
TULSA TO WICHITA																	
15,000	-14.7	-14	1	4	6	-9	6	8	10	-1	14	15	16	-5	9	12	13
10,000	-4.6	-5	-0	3	5	2	6	9	11	10	15	16	17	5	10	12	14
5,000	5.1	2	-3	2	5	10	5	9	11	21	16	19	20	13	8	12	14
WASHINGTON, D.C. TO WILMINGTON, DEL.																	
15,000	-14.7	-15	-0	3	5	-12	3	5	7	-3	12	13	14	-7	8	10	12
10,000	-4.6	-7	-3	1	3	-3	1	5	6	6	11	13	13	2	7	10	11
5,000	5.1	-1	-6	-1	2	5	0	4	6	16	11	13	14	9	4	7	9

\*D--DIFFERENCE BETWEEN INDICATED PER CENT RELIABILITY TEMPERATURE AND INTERNATIONAL STANDARD ATMOSPHERE TEMPERATURE.

**TABLE 7**

**AIRPORT TEMPERATURES FOR THE 0, 50, 75, 85,  
95 AND 100 PER CENT PROBABILITY OF OCCURENCE  
BY MONTH, QUARTER, HALF YEAR AND YEAR**

**AIRPORT TEMPERATURES**

TABLE 7. SURFACE RELIABILITY TEMPERATURE IN DEGREES FAHRENHEIT FOR GIVEN PROBABILITIES OF NOT BEING EXCEEDED

PROB	DEC	JAN	FEB	1QT*	MAR	APR	MAY	2QT	1HF**	JUN	JUL	AUG	3QT	SEP	OCT	NOV	4QT	2HF	ANN
ABILENE, TEX.																			
0	10	-9	1	-9	7	25	38	7	-9	52	55	55	52	35	28	16	16	16	-9
50	46	43	48	46	55	65	72	64	55	80	83	83	82	76	66	54	65	74	64
75	56	56	60	59	67	74	80	77	70	87	90	90	89	85	76	63	77	87	81
85	61	62	65	65	72	79	84	82	76	90	93	93	93	89	80	68	82	91	87
95	72	73	75	75	83	87	92	92	88	97	99	100	99	96	88	77	92	100	97
100	89	89	90	90	97	99	104	104	104	106	107	109	109	106	100	91	106	109	109
ADM***	57	55	61	58	68	77	83	76	67	91	95	95	93	87	78	66	77	85	76
AKRON, OHIO.																			
0	-11	-14	-20	-20	-6	11	23	-6	-20	36	41	39	36	29	20	1	1	1	-20
50	30	27	28	29	37	47	59	47	38	68	72	71	70	65	53	40	53	62	50
75	40	38	40	41	48	57	68	61	53	77	80	79	79	74	62	50	66	76	66
85	45	44	45	46	53	62	72	66	59	80	84	83	83	78	66	55	71	81	73
95	54	55	56	57	65	72	81	78	74	88	91	91	92	86	75	65	83	91	87
100	68	73	71	73	82	89	94	94	94	100	102	104	104	99	89	79	99	104	104
ADM***	37	35	36	36	45	57	69	57	46	79	83	81	81	75	63	48	62	72	59
ALAMOGORDO, N. MEX.																			
0	0	-8	1	-8	10	20	30	10	-8	41	49	48	41	33	23	8	8	8	-8
50	44	42	47	44	53	61	70	61	52	78	80	79	79	73	63	49	62	70	61
75	54	53	57	56	63	71	80	74	67	87	88	87	88	82	73	59	74	84	78
85	58	58	62	61	68	75	84	79	74	91	91	90	92	86	77	63	79	90	84
95	67	67	70	69	78	84	92	89	86	99	99	98	100	93	86	72	89	99	96
100	78	79	80	80	91	96	104	104	104	109	110	108	110	102	98	84	102	110	110
ADM***	58	55	61	58	68	76	86	77	67	94	94	93	94	87	78	64	76	85	76
ALBANY, GA.																			
0	11	11	-2	-2	21	32	40	21	-2	48	60	60	48	45	32	15	15	15	-2
50	53	53	54	54	61	67	75	68	61	82	83	82	82	78	69	58	69	75	68
75	63	63	67	66	70	76	84	79	75	90	88	88	90	86	78	68	81	89	83
85	67	67	72	71	74	80	87	83	80	93	91	90	93	90	82	72	86	93	89
95	74	74	80	79	82	87	93	91	90	99	96	96	99	97	89	80	95	100	98
100	84	83	88	88	93	98	100	100	100	106	104	104	106	106	98	89	106	106	106
ADM***	63	63	65	64	72	79	87	79	71	93	93	92	92	88	81	70	80	86	79
ALBANY, N. Y.																			
0	-19	-26	-22	-26	-21	14	27	-21	-26	35	44	35	35	24	19	-11	-11	-11	-26
50	26	23	23	24	33	45	58	45	35	67	71	70	69	62	51	39	50	60	47
75	37	34	34	36	47	54	66	61	50	75	79	78	78	71	60	51	65	76	64
85	42	40	39	41	53	60	70	67	57	79	82	82	82	76	64	57	72	81	71
95	51	50	49	51	66	72	78	79	72	87	89	89	89	86	74	67	84	91	84
100	62	64	63	64	85	93	92	93	93	99	100	99	100	100	91	82	100	100	100
ADM***	34	31	32	32	42	56	69	56	44	79	83	81	81	73	62	47	61	71	57
ALBUQUERQUE, N. MEX.																			
0	7	1	-5	-5	8	19	34	8	-5	45	55	53	45	39	26	10	10	10	-5
50	36	34	40	36	46	56	65	56	46	75	79	77	77	70	58	44	57	67	57
75	44	42	50	47	56	65	73	67	59	82	85	83	85	78	66	52	69	80	71
85	47	46	54	51	60	69	77	73	65	86	88	86	88	81	70	56	74	85	77
95	56	55	62	60	69	77	86	83	78	92	95	92	95	88	77	64	84	94	89
100	68	67	72	72	81	88	98	98	98	101	104	100	104	98	87	74	98	104	104
ADM***	47	46	52	48	60	69	79	69	59	89	92	89	90	82	71	57	70	80	69
ALEXANDRIA, LA.																			
0	10	8	3	3	20	29	39	20	3	45	59	48	45	40	27	19	19	19	3
50	54	51	53	53	60	67	74	67	60	81	83	83	82	79	70	58	69	76	68
75	64	62	65	64	69	76	82	78	73	89	89	91	91	88	80	67	81	88	82
85	68	66	69	69	73	79	85	82	78	93	92	94	94	91	84	71	85	93	88
95	76	75	78	77	82	86	91	90	88	99	99	100	101	97	90	78	94	101	98
100	85	87	88	88	93	93	99	99	99	106	109	107	109	104	98	88	104	109	109
ADM***	63	61	63	62	70	78	84	78	70	91	93	93	92	90	82	68	80	86	78
ALLENTOWN, PA.																			
0	-4	-7	-12	-12	-5	20	30	-5	-12	39	46	41	39	31	21	3	3	3	-12
50	33	30	30	31	39	49	61	50	40	70	75	72	72	65	54	43	54	63	52
75	42	41	41	42	50	57	69	63	54	78	82	80	80	74	63	53	67	77	67
85	47	46	46	47	55	61	73	69	60	82	85	83	84	77	68	58	72	82	74
95	56	58	57	59	67	71	82	80	74	90	92	90	92	85	78	68	83	92	86
100	70	76	73	76	85	85	95	95	95	102	103	100	103	97	93	82	97	103	103
ADM***	41	38	39	39	48	60	72	60	50	81	85	83	83	76	66	53	65	74	62
AMARILLO, TEX.																			
0	5	-7	-14	-14	-3	14	28	-3	-14	42	53	49	42	33	25	3	3	3	-14
50	37	35	40	37	46	56	64	55	46	74	78	77	76	69	59	45	58	67	57
75	47	46	53	50	58	66	73	69	61	82	84	84	85	78	68	56	71	81	73
85	51	52	58	56	64	71	78	75	68	86	87	87	88	82	72	61	77	87	80
95	63	63	68	67	76	80	87	87	82	95	94	95	96	90	81	71	87	97	92
100	81	81	82	82	92	94	102	102	102	108	104	106	108	102	95	85	102	108	108
ADM***	51	49	54	51	61	70	78	69	60	88	92	90	90	83	73	60	72	81	71
ANCHORAGE, ALASKA.																			
0	-33	-35	-38	-38	-22	-21	1	-22	-38	31	35	31	31	19	-6	-21	-21	-21	-38
50	14	13	9	12	25	35	46	35	24	54	57	56	56	48	36	22	35	45	35
75	25	25	21	24	36	48	57	49	39	60	63	62	62	55	46	33	48	61	51
85	30	30	26	30	40	52	61	55	46	64	66	65	66	58	49	38	53	66	58
95	40	41	39	41	47	58	70	67	61	72	73	72	74	64	56	47	62	76	71
100	53	56	57	57	56	63	82	82	82	86	83	82	86	73	63	60	73	86	86
ADM***	20	20	27	23	34	44	55	44	33	63	65	64	64	56	43	29	43	53	43
ANDERSON, S. C.																			
0	2	0	3	0	11	25	31	11	0	45	55	53	45	41	22	11	11	11	0
50	45	45	46	46	53	61	70	61	53	78	80	78	79	74	64	53	63	71	62
75	55	56	57	57	63	70	79	74	67	87	86	85	87	82	74	63	76	85	77
85	60	61	61	61	68	74	83	78	73	90	89	88	91	84	78	67	81	90	83
95	68	70	70	70	78	85	91	88	84	97	97	95	98	94	86	76	91	98	94
100	80	81	82	82	93	94	101	101	101	106	108	105	108	105	97	87	105	108	108
ADM***	55	55	57	55	64	73	82	73	64	90	90	89	89	84	76	64	75	82	73

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NO. D6-7176

## SURFACE RELIABILITY TEMPERATURE IN DEGREES FAHRENHEIT FOR GIVEN PROBABILITIES OF NOT BEING EXCEEDED

PNOS	DEC	JAN	FEB	1QT*	MAR	APR	MAY	2QT	1HF**	JUN	JUL	AUG	3QT	SEP	OCT	NOV	4QT	2HF	ANN
BEAUMONT, TEX.																			
0	20	12	13	12	24	37	49	24	12	61	66	62	61	48	38	27	27	27	12
50	56	55	57	56	62	69	76	69	63	83	84	84	84	80	72	61	71	77	70
75	65	65	67	66	72	77	83	79	74	88	89	90	89	87	80	69	81	89	83
85	69	69	71	70	76	81	85	83	79	90	91	92	92	90	83	73	85	92	88
95	76	75	77	77	84	87	90	90	87	95	96	98	98	95	90	80	93	99	97
100	86	83	84	86	95	97	95	97	97	101	103	106	106	102	98	89	102	106	106
ADM***	65	64	66	65	71	78	85	78	72	91	92	93	92	89	82	71	81	86	79
BIG MOUNTAIN, ALASKA																			
0	-31	-47	-46	-47	-27	-13	4	-27	-47	30	34	32	30	24	7	-20	-20	-20	-47
50	14	15	19	16	20	32	41	31	23	50	55	54	53	47	36	23	36	44	34
75	24	28	32	29	30	41	50	44	40	56	60	60	59	53	43	33	48	59	52
85	28	33	36	34	34	45	54	50	46	59	63	63	63	56	46	36	53	64	58
95	36	41	43	41	41	50	61	59	57	67	71	70	70	61	51	42	60	73	70
100	44	48	47	48	48	55	71	71	71	79	82	80	82	69	58	48	69	82	82
ADM***	21	22	26	23	28	39	49	39	31	59	62	61	61	54	42	29	42	51	41
BIG SPRINGS, TEXAS																			
0	8	-7	-1	-7	8	24	27	8	-7	42	51	51	42	33	25	3	3	3	-7
50	48	45	50	48	57	67	74	66	57	82	84	84	83	76	67	55	66	75	66
75	58	58	63	61	69	77	85	80	72	92	92	92	93	86	77	67	80	91	83
85	63	63	69	68	74	81	89	85	78	96	96	95	97	90	82	71	86	96	89
95	74	75	81	80	84	89	97	94	90	104	103	101	105	97	90	80	95	106	101
100	91	91	99	99	98	100	106	106	106	115	112	109	115	106	102	91	106	115	115
ADM***	62	59	65	62	73	82	88	81	72	95	97	97	96	90	81	70	80	88	80
BILLINGS, MONT.																			
0	-17	-30	-38	-38	-19	-5	14	-19	-38	32	42	40	32	26	4	-14	-14	-14	-38
50	27	23	26	25	34	46	56	45	35	64	73	71	69	60	49	36	48	59	47
75	38	36	41	40	47	59	67	61	53	73	81	79	79	69	60	47	64	76	67
85	43	41	47	46	52	65	71	67	61	77	85	83	83	74	65	52	70	82	75
95	54	53	57	56	62	76	81	80	76	87	94	91	93	84	74	61	83	93	89
100	69	68	69	69	75	92	96	96	96	102	106	104	106	100	86	71	100	106	106
ADM***	36	32	36	35	44	58	68	57	46	77	88	86	83	73	61	45	60	71	59
BINGHAMPTON, N. Y.																			
0	-22	-28	-26	-28	-11	7	23	-11	-28	31	40	34	31	25	17	10	10	10	-28
50	29	26	26	27	35	46	58	46	37	67	71	69	69	63	51	41	51	60	48
75	41	39	39	40	47	57	67	60	53	76	79	78	79	72	61	49	63	73	66
85	46	44	44	46	53	62	71	66	60	80	83	82	83	77	65	54	68	78	73
95	56	55	56	57	65	74	80	78	74	88	91	89	91	86	76	64	81	88	87
100	68	70	73	73	83	92	94	94	94	100	103	100	103	100	92	80	100	103	103
ADM***	36	34	35	35	44	56	69	56	46	78	83	80	80	74	62	48	61	71	58
BIRMINGHAM, ALA.																			
0	5	1	-10	-10	12	27	35	12	-10	46	52	51	46	39	27	5	5	5	-10
50	46	45	48	46	54	62	70	62	54	77	80	79	79	75	64	52	63	71	63
75	56	56	61	59	64	70	78	74	69	85	87	86	87	84	73	63	77	86	79
85	60	60	65	64	69	74	82	78	75	89	90	89	90	87	76	67	83	91	85
95	68	69	73	72	78	81	89	87	86	96	97	95	97	95	84	75	93	99	95
100	80	81	82	82	90	91	99	99	99	106	107	104	107	106	94	84	106	107	107
ADM***	56	56	58	57	65	74	82	74	65	89	90	90	90	86	77	64	76	83	74
BISBEE, ARIZ.																			
0	13	8	11	8	22	28	32	22	8	43	53	47	43	41	28	16	16	16	8
50	48	45	48	47	53	61	68	61	54	76	77	75	74	72	64	54	63	70	62
75	56	55	58	57	62	69	77	71	66	84	84	82	85	80	73	63	75	82	75
85	60	59	62	62	66	73	81	76	71	88	87	86	88	83	77	67	79	87	80
95	68	70	72	71	75	82	89	86	83	95	94	92	94	90	86	77	88	96	91
100	78	85	85	85	88	95	101	101	101	106	104	101	106	100	98	90	100	106	106
ADM***	60	57	61	59	67	75	83	75	67	91	90	88	90	86	78	67	77	83	75
BISMARCK, N. DAK.																			
0	-36	-44	-34	-44	-31	-2	19	-31	-44	33	39	37	33	16	6	-19	-19	-19	-44
50	16	9	13	12	27	43	55	42	27	64	72	69	69	59	46	28	44	56	42
75	28	22	25	26	41	55	65	59	45	73	81	78	78	70	57	40	60	74	62
85	34	28	31	33	48	61	70	66	54	77	85	83	83	75	62	46	67	81	71
95	45	39	43	45	61	73	81	80	72	85	94	93	93	86	75	57	82	94	87
100	60	54	62	62	81	92	98	98	98	99	107	109	109	103	95	73	103	109	109
ADM***	26	20	23	23	37	55	67	53	38	76	86	83	82	72	59	38	56	69	53
BOISE, IDAHO.																			
0	-17	-17	-10	-17	10	21	27	10	-17	34	41	41	34	27	20	-3	-3	-3	-17
50	31	27	34	31	42	50	58	50	40	65	75	73	71	62	53	40	52	61	51
75	39	38	44	42	50	58	67	61	55	74	83	81	80	72	61	50	65	76	67
85	43	42	48	47	54	63	71	66	61	79	87	85	85	76	65	54	71	82	75
95	51	51	56	55	63	74	80	77	75	90	95	93	95	87	74	62	84	94	89
100	62	63	66	66	76	92	95	95	95	109	106	105	109	102	88	73	102	109	109
ADM***	38	35	42	38	52	62	71	62	50	79	91	88	86	77	65	49	63	75	62
BOSTON, MASS.																			
0	-17	-13	-18	-18	-8	11	31	-8	-18	41	50	46	41	34	25	-2	-2	-2	-18
50	33	29	29	30	38	47	58	48	39	67	72	72	70	64	55	44	55	62	51
75	45	40	41	42	50	57	66	61	54	74	79	78	78	73	63	56	68	77	67
85	49	45	46	47	55	62	70	67	61	78	82	82	82	77	67	61	74	83	74
95	58	56	55	58	68	72	80	80	75	87	90	89	91	87	76	70	84	93	87
100	69	72	68	72	86	89	97	97	97	100	104	101	104	102	90	83	102	104	104
ADM***	40	37	37	38	45	55	66	55	47	76	80	79	78	73	63	52	62	70	58
BOWLING GREEN, KY.																			
0	-2	-11	-17	-17	2	19	31	2	-17	39	46	41	39	28	19	-7	-7	-7	-17
50	40	39	40	40	49	58	67	58	49	77	79	78	78	71	60	48	60	69	59
75	50	51	54	53	60	68	76	71	65	86	88	87	88	82	70	61	75	86	77
85	54	56	59	58	66	73	80	77	71	90	92	91	92	86	75	66	81	92	84
95	63	65	68	67	76	82	89	87	84	98	100	99	101	94	83	76	92	102	97
100	76	78	79	79	92	96	100	100	100	108	113	110	113	105	94	88	105	113	113
ADM***	49	48	50	49	60	70	80	70	59	89	91	89	90	84	73	58	71	81	70

## SURFACE RELIABILITY TEMPERATURE IN DEGREES FAHRENHEIT FOR GIVEN PROBABILITIES OF NOT BEING EXCEEDED

PROB	DEC	JAN	FEB	1QT*	MAR	APR	MAY	2QT	IMF**	JUN	JUL	AUG	3QT	SEP	OCT	NOV	4QT	2MF	ANN
BOZEMAN, MONT.																			
0	-35	-36	-43	-43	-27	-10	15	-27	-43	26	29	26	26	12	-4	-15	-15	-15	-43
50	25	20	23	23	30	43	51	41	32	57	66	65	63	56	46	32	44	54	43
75	38	33	39	38	44	55	61	58	50	66	76	75	73	67	58	43	59	70	64
85	43	39	44	43	49	60	66	64	58	71	80	81	79	72	63	48	66	78	72
95	52	50	54	54	60	70	77	77	73	82	90	93	91	82	72	58	79	92	89
100	62	65	66	66	75	82	94	94	94	99	104	112	112	97	85	71	97	112	112
ADM***	34	30	33	32	41	55	64	53	43	70	81	80	77	70	58	42	56	67	55
BRISTOL, TENN.																			
0	2	-10	-2	-10	3	20	30	3	-10	41	45	46	41	33	21	5	5	5	-10
50	39	39	40	39	47	56	64	56	47	72	75	74	74	69	58	46	57	65	56
75	48	50	51	51	58	65	73	68	61	80	82	80	82	77	67	56	70	79	72
85	53	55	55	56	62	70	76	73	67	83	86	83	85	81	72	60	75	84	78
95	63	65	65	66	72	79	84	82	79	90	92	90	92	89	81	68	86	93	89
100	78	79	79	79	85	93	94	94	94	99	102	98	102	100	95	80	100	102	102
ADM***	49	49	50	49	58	68	77	68	58	84	86	85	85	81	71	58	70	77	68
BROWNSVILLE, TEXAS.																			
0	29	23	22	22	32	45	53	32	22	49	68	68	49	55	43	37	37	37	22
50	52	61	64	62	68	74	79	74	68	83	84	84	83	81	76	68	75	79	74
75	70	69	74	72	77	81	85	83	79	90	88	88	91	88	83	75	84	89	85
85	74	73	78	76	81	84	88	87	83	93	90	90	94	91	86	79	88	92	89
95	80	79	85	84	88	91	93	93	91	97	95	94	98	96	90	85	95	98	96
100	88	87	94	94	99	100	100	100	100	101	103	100	103	104	95	94	104	104	104
ADM***	72	70	73	72	77	82	87	82	77	91	93	93	92	90	86	77	84	88	83
BRUNSWICK, GA.																			
0	19	17	13	13	24	35	44	24	13	57	63	63	57	51	38	21	21	21	13
50	52	52	53	52	59	67	74	67	59	81	82	81	81	77	68	58	68	74	67
75	60	61	63	62	69	74	82	77	71	87	87	86	87	83	75	67	79	86	79
85	64	65	67	66	73	78	85	81	76	89	89	88	90	86	79	71	83	90	84
95	72	72	75	74	83	84	91	89	86	95	95	94	96	92	86	79	91	97	93
100	84	83	86	86	99	94	100	100	100	104	104	103	104	101	95	89	101	104	104
ADM***	66	66	67	66	72	78	85	78	72	91	92	91	91	87	80	72	79	85	79
BUFFALO, N. Y.																			
0	-9	-14	-21	-21	-4	5	25	-4	-21	35	43	43	35	32	24	2	2	2	-21
50	29	26	25	26	33	44	55	44	35	66	71	69	68	62	51	40	51	60	47
75	39	36	36	38	43	54	64	57	50	73	78	76	77	71	59	50	64	73	64
85	44	42	41	44	49	59	68	63	57	77	81	79	80	75	64	54	69	78	70
95	54	53	52	55	61	70	78	75	72	85	87	87	88	84	74	63	81	88	83
100	70	72	68	72	81	87	94	94	94	97	96	99	99	98	92	76	98	99	99
ADM***	35	32	32	33	41	53	66	53	43	76	81	79	79	73	60	47	60	69	56
BURBANK, CALIF.																			
0	27	21	25	21	32	33	36	32	21	43	47	47	43	43	33	26	26	26	21
50	55	53	54	54	57	61	64	60	57	68	73	74	71	71	65	60	65	68	63
75	62	61	62	63	64	68	72	69	67	75	81	81	80	79	74	69	76	79	74
85	66	65	66	67	68	72	77	74	73	79	85	86	84	84	78	73	81	84	80
95	76	74	76	76	76	81	87	86	85	88	94	95	94	94	88	82	93	95	92
100	90	87	91	91	90	96	105	105	105	103	108	111	111	111	103	95	111	111	111
ADM***	67	65	66	66	69	73	76	72	69	80	87	88	85	86	79	74	80	82	76
BURLINGTON, VT.																			
0	-29	-50	-28	-30	-24	5	25	-24	-30	33	43	38	33	25	17	-3	-3	-3	-30
50	23	18	18	20	29	42	55	42	31	66	70	68	68	60	48	36	48	58	45
75	36	30	30	32	43	52	64	58	47	74	78	76	77	69	57	46	61	72	62
85	41	35	35	38	50	57	68	64	54	77	81	80	81	73	61	51	67	78	69
95	52	47	45	50	63	69	77	77	69	85	89	88	89	82	70	61	78	88	83
100	67	63	60	67	84	86	92	92	92	96	100	101	101	95	85	75	95	101	101
ADM***	31	28	28	29	39	53	67	53	41	78	82	80	80	71	59	44	58	69	55
BUTTE, MONT.																			
0	-37	-48	-52	-52	-36	-13	12	-36	-52	23	29	27	23	12	-19	-34	-34	-34	-52
50	19	14	19	17	27	38	47	37	27	55	62	60	59	50	41	28	40	49	38
75	32	28	35	33	41	51	56	55	46	63	71	69	69	60	55	42	57	68	59
85	37	34	40	39	46	56	61	61	54	68	76	73	73	65	60	48	64	75	67
95	48	43	50	50	55	66	72	73	69	77	85	83	84	75	71	57	76	87	82
100	62	54	60	62	64	79	88	88	88	93	100	99	100	91	83	68	91	100	100
ADM***	31	28	33	31	40	51	61	51	41	69	80	78	75	66	55	41	54	65	53
CALGARY, ALBERTA, CANADA.																			
0	-45	-48	-49	-49	-35	-14	12	-35	-49	26	32	28	26	8	-8	-31	-31	-31	-49
50	19	13	17	16	26	40	50	38	27	56	62	60	59	51	42	28	40	49	38
75	34	28	33	32	40	53	59	55	46	64	70	68	68	61	54	41	56	67	59
85	40	34	39	38	46	59	64	62	54	69	74	72	72	66	59	47	63	74	66
95	52	45	51	51	59	70	74	75	69	79	83	82	82	76	70	58	75	85	80
100	67	61	66	67	75	85	90	90	90	95	97	96	97	90	85	71	90	97	97
ADM***	29	24	28	27	37	53	63	51	39	69	76	74	73	64	54	38	52	63	51
CARLSBAD, N. MEX.																			
0	-2	-7	-17	-17	8	23	31	8	-17	42	52	49	42	33	22	2	2	2	-17
50	46	44	49	46	55	64	72	64	55	80	82	81	81	75	65	52	64	72	64
75	57	56	65	61	67	74	82	77	72	89	89	89	91	84	76	64	78	88	82
85	62	62	71	68	72	78	86	83	79	93	93	93	94	88	80	70	84	94	88
95	72	73	84	82	83	87	95	93	92	101	100	100	102	96	89	81	94	103	100
100	86	88	100	100	98	100	108	108	108	112	110	110	112	106	101	97	106	112	112
ADM***	61	59	65	62	72	81	89	81	71	96	97	96	96	89	81	68	79	88	80
CASPER, WYOMING.																			
0	-17	-40	-23	-40	-16	-3	16	-16	-40	28	39	36	28	15	11	-20	-20	-20	-40
50	26	22	26	25	32	43	53	43	34	62	71	69	67	58	46	33	46	57	45
75	36	36	38	39	44	54	63	57	51	71	79	77	77	69	56	46	62	74	65
85	40	41	42	44	49	59	67	63	58	76	83	81	82	73	60	50	68	80	73
95	48	49	51	53	59	68	76	74	72	86	92	88	91	82	70	58	80	92	87
100	59	57	63	63	73	81	89	89	89	101	104	99	104	95	85	68	95	104	104
ADM***	35	32	36	34	44	56	67	55	45	77	86	83	82	72	58	43	58	70	55

SURFACE RELIABILITY TEMPERATURE IN DEGREES FAHRENHEIT FOR GIVEN PROBABILITIES OF NOT BEING EXCEEDED

PROB	DEC	JAN	FEB	1QT*	MAR	APR	MAY	2QT	1HF**	JUN	JUL	AUG	3QT	SEP	OCT	NOV	4QT	2HF	ANN
CEDAR RAPIDS, IOWA																			
0	-20	-25	-24	-25	-12	12	26	-12	-25	36	44	38	36	23	15	-2	-2	-2	-25
50	26	22	25	24	36	49	61	49	36	70	75	73	73	65	54	38	52	62	49
75	37	33	37	36	48	59	70	64	53	79	83	81	82	75	63	48	65	77	67
85	42	38	42	41	54	64	75	70	61	83	87	86	86	79	68	52	71	83	75
95	52	48	51	51	66	75	86	84	78	91	96	95	96	88	77	62	83	95	89
100	65	61	64	65	85	91	104	104	104	103	109	108	109	99	91	77	99	109	109
ADM***	34	31	34	33	45	61	72	59	46	81	87	84	84	76	65	47	63	73	60
CHARLESTON, S. C.																			
0	12	10	7	7	24	32	45	24	7	49	61	62	49	49	37	17	17	17	7
50	52	51	53	52	58	66	73	66	59	80	82	81	81	78	68	59	68	74	67
75	62	61	63	62	67	74	80	76	71	87	87	86	88	85	76	68	80	87	80
85	65	65	67	66	71	77	83	80	76	90	90	89	91	87	79	71	84	91	85
95	72	73	74	74	80	84	90	88	86	96	95	94	97	93	86	77	92	98	94
100	81	82	82	82	94	93	99	99	99	104	104	102	104	100	95	84	100	104	104
ADM***	60	59	60	60	66	73	80	73	66	86	88	87	87	84	75	66	75	81	74
CHARLESTON, W. VA.																			
0	-17	-9	-11	-17	2	18	31	2	-17	39	46	47	39	33	18	6	6	6	-17
50	38	36	38	38	45	55	64	55	46	72	75	74	74	69	57	46	57	65	56
75	51	48	50	51	56	65	72	67	61	80	83	81	83	78	67	56	70	79	73
85	56	53	55	56	62	70	76	73	68	84	87	85	87	82	72	61	76	85	80
95	66	65	66	67	74	80	85	83	81	93	95	94	95	91	82	72	87	95	92
100	79	81	80	81	92	96	98	98	98	105	108	108	108	104	96	88	104	108	108
ADM***	48	46	49	47	57	68	77	67	57	85	87	86	86	81	71	57	70	78	68
CHARLOTTE, N. C.																			
0	-5	-1	-5	-5	14	24	37	14	-5	45	55	53	45	38	26	14	14	14	-5
50	43	42	44	43	51	60	68	60	51	77	79	77	77	73	62	50	61	69	60
75	54	53	56	55	61	69	76	71	65	84	85	84	85	81	71	60	73	82	76
85	59	57	61	60	65	73	80	76	71	88	88	87	89	85	75	64	79	87	81
95	68	67	70	69	76	82	87	85	82	94	94	93	95	93	84	72	89	95	92
100	79	79	82	82	91	96	98	98	98	103	103	103	103	104	98	85	104	104	104
ADM***	53	52	55	53	62	71	80	71	62	88	89	87	88	83	73	61	73	80	71
CHATTANOOGA, TENN.																			
0	3	-7	-10	-10	2	25	36	2	-10	39	54	50	39	37	22	4	4	4	-10
50	42	42	44	43	51	60	68	59	51	76	78	77	77	73	61	49	61	69	60
75	52	53	56	55	62	69	76	73	66	85	85	84	86	81	70	60	74	83	76
85	56	58	61	60	67	73	80	78	72	88	88	88	90	85	74	64	80	89	82
95	65	67	69	68	77	81	87	87	83	95	95	95	97	93	83	72	90	97	93
100	78	78	79	79	89	93	99	99	99	104	106	105	106	104	94	83	104	106	106
ADM***	52	52	55	53	62	72	80	71	62	88	90	89	89	85	74	61	73	81	71
CHEYENNE, WYO.																			
0	-16	-27	-34	-34	-21	-6	16	-21	-34	25	38	37	25	18	2	-12	-12	-12	-34
50	29	26	28	27	32	41	50	41	34	60	68	67	65	57	46	35	46	56	45
75	40	38	42	42	44	52	59	56	51	70	76	74	75	67	57	46	60	71	63
85	45	43	48	47	50	57	64	62	57	74	80	78	79	71	62	51	66	77	70
95	55	52	58	57	60	66	74	74	71	84	88	85	88	80	70	61	77	88	84
100	69	63	70	70	73	78	89	89	89	100	100	96	100	92	82	73	92	100	100
ADM***	40	37	40	39	44	54	63	53	46	74	83	81	79	72	60	47	59	69	58
CHICAGO, ILL.																			
0	-12	-15	-15	-15	-7	19	30	-7	-15	35	49	46	35	36	20	-2	-2	-2	-15
50	28	25	27	27	37	48	59	48	37	69	75	73	72	66	54	40	53	63	50
75	38	35	38	38	48	56	67	62	51	78	81	80	81	74	63	50	67	77	66
85	43	40	43	43	54	60	71	67	58	82	85	83	85	78	67	55	73	83	73
95	52	51	54	53	65	69	80	79	72	91	92	90	93	87	77	66	84	93	86
100	65	67	69	69	82	84	94	94	94	104	103	101	104	101	91	81	101	104	104
ADM***	55	53	55	54	45	58	70	57	46	80	85	83	83	76	64	48	63	73	59
CINCINNATI, OHIO.																			
0	-13	-17	-9	-17	6	18	32	6	-17	40	50	43	40	32	20	1	1	1	-17
50	35	35	35	34	43	54	64	53	44	73	77	75	75	69	57	45	57	66	55
75	46	45	46	47	53	63	72	65	59	81	84	83	84	78	67	55	70	81	72
85	51	51	51	52	59	67	75	70	65	85	88	86	88	82	71	60	76	86	79
95	60	62	61	63	70	76	83	81	78	92	96	93	96	90	80	70	87	97	92
100	71	77	76	77	88	90	95	95	95	102	109	103	109	101	92	83	101	109	109
ADM***	42	41	43	42	53	64	74	64	53	83	87	85	85	80	68	53	67	76	64
CLEVELAND, OHIO.																			
0	-9	-9	-8	-9	-5	19	29	-5	-9	38	46	44	38	32	25	7	7	7	-9
50	31	29	29	29	37	47	59	48	39	69	74	72	72	66	54	42	54	63	51
75	41	39	38	40	48	56	67	61	51	77	81	79	80	74	62	51	66	76	65
85	46	44	43	45	53	60	71	66	57	81	84	83	84	78	67	56	72	81	72
95	55	55	53	56	65	71	79	77	71	89	92	90	92	87	76	66	83	91	85
100	69	73	69	73	83	88	92	92	92	101	103	102	103	101	90	82	101	103	103
ADM***	58	56	56	57	45	57	70	57	47	80	85	83	83	76	64	49	63	73	60
COLLEGE STATION, TEXAS.																			
0	14	-3	5	-3	17	21	43	17	-3	53	52	41	41	42	29	20	20	20	-3
50	54	52	55	54	61	68	75	68	61	82	85	85	84	80	72	60	70	77	69
75	64	65	67	67	71	79	83	80	75	89	92	95	94	88	82	70	82	90	85
85	68	70	71	71	76	82	86	84	81	93	96	98	97	92	86	74	87	94	91
95	77	78	80	80	84	89	93	92	90	99	102	104	103	98	93	82	95	102	100
100	89	88	90	90	96	96	101	101	101	108	110	110	110	105	102	94	105	110	110
ADM***	64	62	65	64	72	79	86	79	71	93	96	97	95	91	84	72	82	89	80
COLORADO SPRINGS, COLO.																			
0	-4	-26	-27	-27	-11	0	21	-11	-27	32	42	43	32	29	17	-8	-8	-8	-27
50	32	29	32	31	37	47	55	46	38	66	71	70	69	62	51	39	51	60	49
75	41	42	45	45	48	58	64	60	54	74	79	77	78	70	60	50	65	75	67
85	47	47	51	50	53	62	68	65	60	78	82	80	82	74	64	55	70	81	73
95	58	57	60	62	62	70	76	75	72	87	89	88	89	81	72	63	80	90	86
100	77	69	72	77	73	81	88	88	88	100	100	99	100	92	83	73	92	100	100
ADM***	44	41	44	43	49	59	68	58	51	79	85	83	82	75	65	52	64	73	62

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• 1QT--FIRST QUARTER DEC-JAN-FEB  
• 1HF--FIRST HALF YEAR DEC---MAY  
• ADM--AVERAGE DAILY MAXIMUM  
PAGE 158

SURFACE RELIABILITY TEMPERATURE IN DEGREES FAHRENHEIT FOR GIVEN PROBABILITIES OF NOT BEING EXCEEDED

PROB	DEC	JAN	FEB	1QT*	MAR	APR	MAY	2QT	1HF**	JUN	JUL	AUG	3QT	SEP	OCT	NOV	4QT	2HF	ANN
FORT SMITH, ARKANSAS.																			
0	6	5	-9	-9	7	26	35	7	-9	50	54	54	50	41	22	15	15	15	-9
50	43	40	45	42	52	63	70	61	52	78	82	82	81	75	64	51	63	72	62
75	52	49	57	55	64	71	78	74	66	85	90	89	89	84	74	60	75	85	78
85	57	54	62	60	68	75	82	79	72	89	93	92	92	87	78	64	80	90	85
95	67	65	71	69	78	82	89	88	84	95	100	99	100	95	86	73	91	100	97
100	82	81	81	82	92	92	98	98	98	105	111	109	111	106	96	86	106	111	111
ADM***	53	51	55	53	64	74	81	73	63	90	94	94	93	87	76	62	75	84	73
FORT WAYNE, IND.																			
0	-8	-9	-17	-17	-7	14	27	-7	-17	38	46	45	38	29	20	-1	-1	-1	-17
50	29	26	28	28	37	48	59	48	38	69	74	71	71	65	53	40	52	62	50
75	38	36	39	39	48	57	67	61	52	77	81	78	80	74	62	50	66	76	66
85	42	41	44	44	52	61	71	67	58	81	84	82	84	78	66	55	72	82	73
95	51	52	54	54	61	71	80	78	72	88	92	89	92	87	76	65	83	92	86
100	64	69	69	69	74	85	92	92	92	100	103	100	103	100	90	79	100	103	103
ADM***	35	33	35	35	45	58	70	58	46	79	84	82	82	75	63	47	62	72	59
FORT WILLIAM, ONTARIO, CANADA																			
0	-38	-42	-40	-42	-34	-10	16	-34	-42	37	35	31	31	17	4	-22	-22	-22	-42
50	14	8	10	10	21	35	47	35	23	57	63	62	61	53	43	27	41	51	37
75	26	20	22	23	35	47	56	51	40	64	72	70	70	63	53	39	56	68	56
85	31	25	28	28	41	53	61	58	48	68	76	74	74	67	57	44	62	75	64
95	40	35	38	39	54	65	73	72	65	79	87	83	86	76	68	55	74	88	81
100	52	48	52	52	73	83	91	91	91	97	104	96	104	89	83	69	89	104	104
ADM***	22	17	20	20	31	45	58	44	32	68	74	72	71	63	51	34	49	60	46
FORT WORTH, TEXAS.																			
0	18	13	17	13	23	30	41	23	13	54	71	61	54	53	29	23	23	23	13
50	48	45	50	48	56	66	73	65	56	81	85	85	84	78	69	56	67	76	66
75	57	54	59	57	65	75	81	75	67	88	90	91	91	85	78	64	78	88	79
85	61	58	63	62	69	78	84	79	72	91	92	94	94	87	81	68	83	92	84
95	71	68	73	72	80	85	89	86	82	96	98	99	101	93	88	77	91	100	95
100	88	82	88	88	96	95	96	96	96	103	109	107	109	102	96	89	102	109	109
ADM***	58	55	60	57	66	76	83	75	66	91	95	96	94	89	79	66	78	86	76
FREDERICTON, N BRUNS. CANADA																			
0	-26	-29	-27	-29	-9	6	20	-9	-29	32	39	36	32	27	16	2	2	2	-29
50	22	17	20	19	28	40	52	40	30	61	67	65	64	57	46	36	46	55	42
75	33	28	31	31	36	49	60	53	45	68	74	72	72	65	54	45	58	68	60
85	38	32	35	36	40	54	65	59	52	72	78	76	76	69	58	49	63	73	67
95	47	41	43	45	47	63	75	71	67	80	86	84	85	77	66	57	73	84	80
100	58	52	54	58	56	76	90	90	90	93	98	97	98	89	78	70	89	98	98
ADM***	30	25	29	28	36	50	63	50	39	72	78	76	75	68	56	43	56	66	52
FRESNO, CALIF.																			
0	23	18	24	18	26	32	38	26	18	44	50	51	44	37	30	27	27	27	18
50	46	45	51	47	56	62	69	62	55	76	82	80	79	74	64	54	64	71	63
75	52	52	58	55	63	70	77	72	65	84	90	87	88	83	73	61	74	82	75
85	55	55	61	59	67	74	81	76	70	88	94	91	92	87	77	65	79	87	80
95	62	62	69	67	75	83	90	87	83	97	101	98	100	97	86	74	92	97	93
100	72	73	80	80	87	97	103	103	103	110	111	110	111	111	100	89	111	111	111
ADM***	55	54	61	57	68	76	84	76	66	92	100	98	97	91	79	66	79	88	77
GAINESVILLE, FLORIDA.																			
0	16	15	6	6	24	32	43	24	6	54	60	60	54	48	33	22	22	22	6
50	59	59	60	59	64	69	76	70	64	80	81	81	81	79	73	64	72	76	70
75	69	69	71	71	74	78	84	80	78	87	86	86	87	86	81	73	83	88	84
85	73	73	75	75	78	81	87	84	83	90	89	89	90	89	85	77	87	92	89
95	79	80	82	82	86	88	93	92	91	96	94	93	96	94	90	83	93	98	97
100	87	89	88	89	96	95	101	101	101	104	102	100	104	99	96	90	99	104	104
ADM***	70	70	71	70	76	81	88	81	76	91	91	91	91	89	83	75	82	86	81
GANDER, NEW FOUNDLAND, CANADA																			
0	-5	-13	-15	-15	-14	4	22	-14	-15	28	36	30	28	31	22	6	6	6	-15
50	25	19	17	20	25	33	44	34	27	52	62	61	58	53	44	34	44	51	39
75	32	27	26	29	34	42	50	46	38	59	69	69	67	60	50	42	54	63	53
85	36	31	30	33	38	46	54	51	44	64	73	72	71	63	54	46	58	68	60
95	43	40	40	42	46	55	63	62	57	74	82	75	81	71	62	54	69	79	74
100	55	53	55	55	56	71	78	78	78	91	96	89	96	84	76	67	84	96	96
ADM***	30	26	25	27	32	40	53	41	34	62	72	69	67	61	51	40	51	59	47
GOOSE BAY, LABRADOR.																			
0	-25	-32	-35	-35	-32	-13	10	-32	-35	30	38	32	30	20	11	-9	-9	-9	-35
50	9	0	5	5	16	28	41	28	16	52	62	58	57	51	38	25	38	47	32
75	19	9	15	15	27	38	50	44	31	58	69	65	65	59	46	33	50	62	49
85	24	14	20	21	31	42	55	51	39	62	73	69	70	63	50	37	55	68	57
95	35	25	30	33	40	51	68	66	58	72	83	77	81	71	59	46	67	81	74
100	53	42	46	53	51	62	89	89	89	89	100	91	100	84	73	58	84	100	100
ADM***	16	8	14	13	25	37	49	37	25	61	71	67	66	59	45	31	45	56	40
GLENS FALLS, N. Y.																			
0	-30	-36	-32	-36	-15	3	20	-15	-36	32	32	38	32	24	17	-7	-7	-7	-36
50	27	27	26	26	33	46	60	46	36	49	74	71	71	62	52	39	51	61	49
75	40	41	39	41	45	58	70	61	54	78	84	79	81	71	61	50	65	77	68
85	45	46	44	46	50	63	74	68	62	82	88	83	85	75	65	56	70	82	75
95	54	55	52	55	62	75	84	80	77	91	95	91	93	83	74	66	81	92	88
100	65	64	61	65	78	92	98	98	98	102	103	102	103	94	88	82	94	103	103
ADM***	36	37	37	36	43	59	73	58	47	85	88	84	85	75	64	49	62	74	60
GRAND FORKS, N. DAK.																			
0	-30	-36	-33	-36	-38	-3	20	-38	-38	32	39	34	32	18	9	-16	-16	-16	-38
50	11	4	8	8	21	41	53	39	23	63	69	67	66	57	45	27	43	55	39
75	22	15	17	20	37	53	62	57	40	71	77	76	75	67	55	37	58	71	58
85	28	21	22	25	44	60	67	64	48	74	81	80	80	72	60	42	64	77	66
95	40	33	30	38	59	73	78	78	67	83	90	89	89	82	70	52	78	89	81
100	58	51	41	58	82	95	96	96	96	95	103	102	103	98	87	66	98	103	103
ADM***	20	14	18	17	31	52	66	49	33	74	82	80	79	69	57	36	54	66	50



PROB	DEC	JAN	FEB	1QT	MAR	APR	MAY	2QT	1MF	JUN	JUL	AUG	3QT	SEP	OCT	NOV	4QT	2MF	ANN
HOMER, ALASKA.																			
0	-13	-17	-18	-18	-7	-9	6	-9	-18	29	34	33	29	22	10	-6	-6	-6	-18
50	23	23	27	24	28	36	42	36	30	49	53	53	52	47	39	29	38	45	37
75	32	32	37	34	36	46	51	46	41	55	58	58	58	53	45	37	48	57	50
85	35	35	40	38	39	49	54	50	46	58	61	61	61	56	48	41	52	61	56
95	41	42	46	44	44	55	60	58	56	66	68	68	68	61	53	48	59	69	66
100	48	49	52	52	50	60	68	68	68	79	79	78	79	68	60	58	68	79	79
ADM***	30	30	34	31	36	43	50	43	37	57	61	60	59	55	45	35	45	52	45
HONOLULU, HAWAII.																			
0	55	54	52	52	53	59	60	53	52	63	63	63	63	63	63	59	59	59	52
50	74	73	72	73	72	73	75	73	73	77	78	79	78	78	77	75	77	77	75
75	78	77	76	77	76	77	79	78	78	80	81	82	81	81	81	79	81	81	80
85	79	78	78	79	78	78	80	80	80	81	82	83	82	83	82	80	83	83	82
95	82	81	81	82	81	81	83	83	83	84	85	86	85	85	85	83	86	86	86
100	85	84	84	85	84	86	87	87	87	88	88	88	88	88	90	86	90	90	90
ADM***	78	76	76	77	77	78	80	78	77	81	82	83	82	83	82	80	82	82	80
HOT SPRINGS, ARKANSAS.																			
0	0	-9	-12	-12	7	26	31	7	-12	45	51	43	43	35	24	14	14	14	-12
50	46	45	47	46	55	64	71	63	54	80	83	83	82	76	66	53	65	73	64
75	57	57	61	59	66	73	81	76	70	88	91	93	91	86	76	63	78	87	81
85	61	62	66	64	71	77	85	82	76	92	94	97	95	90	80	67	83	93	88
95	70	70	74	73	80	84	93	91	88	100	101	104	104	98	88	76	94	103	100
100	81	81	84	84	93	94	103	103	103	112	111	115	115	109	99	89	109	115	115
ADM***	55	54	58	56	66	76	83	75	65	91	94	95	93	88	79	63	77	85	75
HOULTON, MAINE.																			
0	-30	-27	-35	-35	-18	11	20	-18	-35	50	58	56	50	22	16	-5	-5	-5	-35
50	19	13	12	15	26	39	51	39	27	60	66	64	64	55	45	33	44	54	40
75	31	24	23	27	37	47	60	53	43	68	74	72	72	64	53	42	56	68	58
85	36	29	28	33	42	51	64	59	50	72	77	75	76	67	56	46	62	73	65
95	46	39	37	44	51	59	74	72	66	80	85	83	85	75	65	54	72	84	79
100	59	55	48	59	63														

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PROB	DEC	JAN	FEB	1QT*	MAR	APR	MAY	2QT	1HF**	JUN	JUL	AUG	3QT	SEP	OCT	NOV	4QT	2HF	ANN
JACKSON, MISS.																			
0	16	-5	1	-5	17	50	42	17	-5	48	57	54	48	41	28	18	18	18	-5
50	49	48	51	49	57	65	72	65	57	80	82	81	81	77	66	55	66	74	65
75	58	61	62	62	66	73	80	76	71	87	88	88	89	85	76	64	78	86	81
85	62	65	67	67	70	77	85	80	77	90	91	91	92	89	79	68	82	91	87
95	71	74	74	75	78	84	90	89	87	96	96	97	98	95	87	76	91	98	96
100	84	85	82	85	88	93	99	99	99	103	104	106	106	103	96	86	103	106	106
ADM***	59	59	62	60	68	76	84	76	68	91	94	93	93	89	80	67	79	86	77
JACKSONVILLE, FLORIDA.																			
0	14	15	10	10	25	34	46	25	10	54	64	64	54	49	37	22	22	22	10
50	56	56	58	57	62	68	75	69	63	80	82	82	81	79	71	62	71	76	69
75	66	65	68	67	71	76	82	79	75	87	87	87	88	86	79	71	82	88	83
85	70	69	72	71	75	80	85	83	80	90	90	89	91	89	82	74	86	92	87
95	76	76	79	79	82	86	91	90	88	95	96	94	97	94	88	80	92	99	96
100	84	85	87	87	91	93	99	99	99	103	105	102	105	100	96	87	100	105	105
ADM***	67	66	68	67	73	79	85	79	73	90	91	91	91	88	80	72	80	85	79
JAMESTOWN, N. DAK.																			
0	-30	-6	-32	-36	-29	-5	12	-29	-36	30	35	35	30	18	6	-17	-17	-17	-36
50	15	7	11	10	23	42	53	39	25	62	69	67	66	57	46	27	43	55	50
75	24	19	21	23	37	54	64	56	41	71	78	76	76	67	56	38	58	71	58
85	30	24	25	29	44	60	69	63	49	75	82	80	80	72	61	43	65	78	66
95	42	36	33	41	58	74	79	77	67	84	91	90	90	83	72	54	80	90	83
100	61	53	44	61	80	94	95	95	95	98	104	105	105	100	87	69	100	105	105
ADM***	25	17	21	20	33	54	66	51	36	74	82	81	79	71	59	36	55	67	51
JOPLIN, MO.																			
0	-1	-8	-5	-8	-5	26	37	-5	-8	48	52	46	46	36	26	10	10	10	-8
50	38	35	38	37	44	57	67	56	46	76	78	79	78	70	61	45	59	68	57
75	48	46	49	48	55	65	74	70	60	84	85	87	86	79	70	54	71	82	73
85	53	51	53	53	60	69	77	75	66	87	88	90	89	83	74	58	77	87	79
95	62	61	62	63	69	78	85	84	78	93	95	97	96	92	82	67	88	96	91
100	76	77	74	77	81	91	95	95	95	103	104	106	106	105	93	81	105		

**THE BOEING COMPANY**  
**TRANSPORT DIVISION**

NO. 06-7176

## SURFACE RELIABILITY TEMPERATURE IN DEGREES FAHRENHEIT FOR GIVEN PROBABILITIES OF NOT BEING EXCEEDED

PROB	DEC	JAN	FEB	1QT*	MAR	APR	MAY	2QT	1HF**	JUN	JUL	AUG	3QT	SEP	OCT	NOV	4QT	2HF	ANN
LACONIA, N.H.																			
0	-28	-36	-40	-40	-21	5	20	-21	-40	28	37	33	28	23	10	-8	-8	-8	-40
50	24	21	21	22	31	43	56	43	33	65	70	68	68	60	49	37	49	58	45
75	37	34	35	37	45	54	65	59	51	75	79	77	78	70	59	48	62	74	65
85	42	40	40	42	51	60	70	66	59	79	83	81	82	74	64	54	68	79	73
95	51	51	49	53	65	72	81	79	75	88	91	89	91	82	74	65	80	90	87
100	64	66	59	66	85	92	97	97	97	102	103	100	103	95	90	81	95	103	103
ADM***	34	31	32	32	42	56	70	56	44	79	83	81	81	72	61	47	60	70	57
LAFAYETTE, LA.																			
0	14	10	6	6	24	32	42	24	6	53	57	53	53	41	27	21	21	21	6
50	55	54	57	55	61	68	75	68	62	81	82	82	82	78	70	59	69	75	68
75	65	65	68	67	70	76	82	78	74	88	89	89	89	86	79	69	80	87	83
85	69	69	72	71	74	79	85	82	79	91	92	92	92	89	83	73	84	92	88
95	78	78	79	79	82	86	91	89	88	97	98	97	98	95	89	81	92	99	97
100	89	89	87	89	93	93	98	98	98	106	107	103	107	101	96	92	101	107	107
ADM***	66	64	67	65	72	79	86	79	72	91	92	92	92	89	82	71	81	86	79
LAKE CHARLES, LA.																			
0	21	12	13	12	25	34	46	25	12	58	63	61	58	45	35	27	27	27	12
50	54	53	56	54	61	68	75	68	61	81	82	82	82	79	70	59	69	76	68
75	62	62	66	64	70	76	81	78	72	86	87	88	88	86	79	67	79	86	81
85	66	66	69	68	74	79	84	81	77	88	89	90	90	89	82	71	83	90	86
95	72	73	76	75	82	85	90	89	86	93	94	96	96	94	88	78	90	97	94
100	82	81	84	84	94	92	97	97	97	98	101	104	104	99	96	88	99	104	104
ADM***	64	62	65	64	70	78	84	77	70	90	91	92	91	88	82	70	80	85	78
LAKELAND, FLA.																			
0	25	28	29	25	30	40	56	30	25	63	66	63	63	61	43	30	30	30	25
50	63	62	63	63	67	72	77	72	67	80	81	82	81	80	74	67	74	77	72
75	71	70	71	71	75	79	82	81	77	85	85	86	86	85	81	75	83	88	83
85	74	73	75	75	78	82	85	85	81	87	88	88	88	87	84	78	87	91	87
95	79	78	81	81	84	87	90	91	89	92	93	92	93	91	89	83	92	96	94
100	85	85	88	88	91	94	99	99	99	100	101	98	101	97	94	89	97	101	101
ADM***	72	72	74	72	77	82	87	82	77	90	90	91	90	88	83	76	82	86	82
LANCASTER, PA.																			
0	-9	-27	-18	-27	0	11	27	0	-27	33	42	39	33	27	19	-7	-7	-7	-27
50	33	32	32	32	41	51	62	51	42	71	74	72	72	65	54	43	54	63	52
75	43	46	44	46	52	61	71	64	58	80	83	81	82	75	63	55	68	79	71
85	48	52	50	52	57	66	76	70	65	84	86	85	86	79	68	60	74	85	78
95	58	63	61	63	69	77	85	81	79	92	93	94	95	87	78	70	85	95	91
100	73	77	78	78	88	94	98	98	98	103	104	107	107	99	95	82	99	107	107
ADM***	42	41	42	42	53	65	76	64	53	83	87	84	85	78	66	54	66	75	64
LAND O LAKES, WISC.																			
0	-33	-50	-42	-50	-43	-12	14	-43	-50	23	29	26	23	12	8	-18	-18	-18	-50
50	16	10	12	12	24	38	49	37	24	58	63	62	61	53	44	28	41	51	38
75	27	23	24	27	40	50	54	55	43	67	72	71	71	63	53	40	56	67	58
85	32	28	28	32	47	54	63	62	51	71	75	75	75	67	58	46	62	73	66
95	41	34	34	41	60	69	73	74	67	79	82	84	84	76	67	57	73	85	81
100	52	44	45	52	78	88	89	89	89	90	92	98	98	89	85	74	89	98	98
ADM***	25	21	24	23	34	51	63	50	37	72	77	76	75	66	57	34	53	64	50
LANSING, MICH.																			
0	-18	-17	-25	-25	-10	8	23	-10	-25	34	42	38	34	29	19	5	5	5	-25
50	27	24	24	25	33	45	57	45	35	67	71	69	69	62	51	38	50	60	47
75	38	34	34	37	45	55	65	59	50	76	79	77	78	70	59	47	62	73	65
85	43	39	41	42	50	60	70	64	57	79	82	81	82	75	63	51	67	78	71
95	52	49	52	52	63	71	79	74	72	87	90	89	90	83	73	61	79	88	85
100	64	63	66	66	82	88	93	93	93	98	102	102	102	97	87	76	97	102	102
ADM***	33	31	32	32	42	56	68	55	43	77	82	80	80	72	60	45	59	70	56
LAS VEGAS, NEV.																			
0	14	8	17	8	19	31	38	19	8	48	56	54	48	43	32	15	15	15	8
50	47	44	50	47	57	66	74	65	56	84	91	88	87	81	67	54	67	77	67
75	55	53	59	57	66	74	83	77	69	93	99	97	97	90	76	63	80	92	81
85	59	57	63	61	70	78	87	82	75	96	102	100	101	94	80	67	86	97	87
95	67	65	71	70	78	87	96	93	89	105	109	107	108	102	88	74	97	106	100
100	78	76	82	82	89	99	109	109	109	116	117	116	117	113	100	84	113	117	117
ADM***	58	55	62	59	69	79	88	78	68	99	105	103	103	96	82	67	82	92	80
LAWRENCE, MASS.																			
0	-20	-25	-25	-25	-6	9	27	-6	-25	36	47	40	36	28	19	4	4	4	-25
50	29	26	26	27	35	46	58	46	37	67	72	70	70	63	53	41	52	61	49
75	41	38	38	40	47	56	66	60	53	75	79	78	79	72	61	51	64	75	67
85	46	44	43	45	52	61	71	64	60	79	83	82	83	76	65	56	70	80	74
95	55	54	53	55	65	72	81	79	75	88	92	89	92	84	74	64	81	91	88
100	67	69	65	69	84	89	98	98	98	101	106	100	106	97	88	81	97	106	106
ADM***	38	35	35	36	44	56	69	56	46	78	83	81	80	73	63	50	62	71	59
LAWTON, OKLA.																			
0	-11	-3	-11	-11	6	23	30	6	-11	45	53	46	45	35	16	12	12	12	-11
50	43	41	45	43	53	63	71	62	53	80	84	84	82	76	65	51	64	73	63
75	54	54	58	57	65	73	81	75	68	88	92	93	92	86	77	61	77	88	80
85	59	59	64	63	70	77	85	81	75	92	95	97	96	90	82	66	83	93	87
95	69	70	76	76	82	86	94	92	88	100	103	105	104	99	91	75	94	103	100
100	83	85	95	95	98	100	106	106	106	111	114	115	115	110	103	88	110	115	115
ADM***	55	53	58	55	67	76	83	75	65	92	97	98	95	90	79	64	78	87	76
LEBANON, N. H.																			
0	-27	-29	-32	-32	-26	10	22	-26	-32	29	38	35	29	20	16	-10	-10	-10	-32
50	22	19	19	20	31	43	54	43	31	63	68	66	66	59	48	36	47	57	44
75	34	31	31	33	45	52	62	59	47	72	76	74	75	68	57	47	61	72	62
85	39	34	36	38	52	57	67	65	55	76	79	78	79	72	62	53	67	77	69
95	50	48	46	49	63	68	77	77	70	84	86	86	87	81	72	64	79	87	81
100	64	64	59	64	83	86	92	92	92	95	95	97	97	94	88	80	94	97	97
ADM***	33	30	32	32	43	55	67	55	43	77	82	79	79	72	62	49	60	69	54

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NO. 06-7176

PROB	DEC	JAN	FEB	1QT	MAR	APR	MAY	2QT	1MF	JUN	JUL	AUG	3QT	SEP	OCT	NOV	4QT	2MF	ANN
<b>MANCHESTER, N. H.</b>																			
0	-28	-18	-25	-29	-18	17	28	-18	-29	40	44	41	40	30	18	4	4	4	-29
50	28	24	25	25	34	45	56	45	35	65	71	68	68	60	50	39	50	59	47
75	40	45	37	38	46	53	64	60	51	72	78	75	75	68	58	49	61	72	65
85	45	39	41	43	51	57	69	66	59	74	81	79	79	72	62	53	66	77	72
95	53	48	50	51	62	68	79	79	74	84	89	86	87	80	70	63	77	87	84
100	61	60	59	61	76	84	96	96	96	97	100	98	100	92	82	77	92	100	100
ADM***	36	33	34	34	42	54	67	54	44	76	80	77	78	69	59	47	58	68	56
<b>MARTHAS VINEYARD, MASS.</b>																			
0	-9	-8	-12	-12	2	20	30	2	-12	39	47	45	39	32	24	11	11	11	-12
50	35	32	31	32	36	45	55	45	39	64	71	70	68	64	55	45	54	61	50
75	45	41	41	43	45	52	63	57	52	71	77	77	74	72	62	53	65	73	65
85	49	46	44	47	50	56	67	63	59	75	80	80	80	75	66	56	70	78	71
95	56	54	52	55	59	66	77	75	72	83	87	88	88	83	73	62	80	88	84
100	65	65	60	65	73	81	93	93	93	97	98	100	100	94	83	70	94	100	100
ADM***	42	39	38	40	43	53	63	53	46	71	78	78	75	71	62	52	62	69	58
<b>MASSENA, N. Y.</b>																			
0	-42	-43	-37	-43	-24	0	20	-24	-43	34	40	38	34	28	17	-7	-7	-7	-43
50	23	18	19	20	29	43	55	42	31	65	71	69	68	61	50	37	49	59	45
75	38	33	32	35	42	55	65	58	49	73	79	76	77	69	58	48	63	74	65
85	44	39	37	41	48	60	69	65	57	77	82	80	81	73	62	53	68	79	72
95	55	50	46	53	61	70	79	77	72	86	90	87	89	81	70	62	79	89	85
100	68	65	57	68	79	86	93	93	93	98	100	98	100	93	82	75	93	100	100
ADM***	32	28	28	29	37	53	67	52	41	76	82	80	79	71	59	45	59	69	55
<b>MAYO, Y. T., CANADA</b>																			
0	-72	-73	-67	-73	-56	-42	9	-56	-73	26	27	16	16	4	-34	-59	-59	-59	-73
50	-10	-11	-5	-8	13	30	46	30	11	56	58	53	56	43	29	4	26	41	26
75	7	5	11	8	28	46	56	50	32	64	66	62	66	53	43	19	45	63	49
85	14	12	18	15	34	52	61	57	41	69	70	66	71	58	48	25	52	70	58
95	29	28	32	31	43	60	72	72	61	79	79	75	80	47	57	34	65	83	74
100	52	50	53	53	54	68													

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## SURFACE RELIABILITY TEMPERATURE IN DEGREES FAHRENHEIT FOR GIVEN PROBABILITIES OF NOT BEING EXCEEDED

PROB	DEC	JAN	FEB	1QT*	MAR	APR	MAY	2QT	1HF**	JUN	JUL	AUG	3QT	SEP	OCT	NOV	4QT	2HF	ANN
MIDLAND, TEXAS.																			
0	8	7	-1	-1	10	28	39	10	-1	54	56	60	54	46	32	16	16	16	-1
50	45	44	49	46	56	65	73	64	55	80	82	81	81	75	67	53	65	73	64
75	55	54	61	58	67	73	82	78	69	87	89	87	88	83	75	62	77	86	79
85	60	58	66	63	71	77	86	83	76	90	91	90	92	87	79	66	82	91	85
95	70	68	75	73	79	85	95	93	89	98	97	96	99	95	87	74	93	99	96
100	85	83	87	87	90	96	107	107	107	109	106	106	109	107	98	86	107	109	109
ADM***	58	57	62	59	70	79	86	78	68	93	94	93	93	87	79	66	77	85	77
MILWAUKEE, WISC.																			
0	-12	-24	-19	-24	-7	13	28	-7	-24	33	45	44	33	28	21	-5	-5	-5	-24
50	26	22	24	24	33	44	54	44	34	65	71	70	69	63	51	37	50	60	47
75	35	33	35	36	44	53	62	57	49	73	78	77	78	72	60	48	64	74	64
85	40	38	39	40	50	57	66	62	55	77	82	80	82	76	64	53	70	80	71
95	49	48	48	50	62	67	75	74	70	86	89	88	90	85	72	63	82	90	84
100	63	62	60	63	81	82	90	90	90	99	101	100	101	98	86	77	98	101	101
ADM***	33	29	32	31	41	53	64	52	42	75	81	79	78	72	60	45	59	69	55
MINNEAPOLIS-ST. PAUL, MINN.																			
0	-22	-31	-28	-31	-27	9	26	-27	-31	34	48	40	34	26	18	-9	-9	-9	-31
50	19	15	18	17	31	46	59	45	31	68	74	72	71	62	50	33	49	60	46
75	30	26	29	30	45	56	67	62	47	77	81	80	80	71	59	44	63	76	64
85	35	31	34	35	51	62	71	68	55	81	85	83	85	76	64	49	69	82	71
95	46	42	43	47	62	73	81	80	71	89	92	91	93	85	74	59	81	92	86
100	63	58	56	63	78	92	95	95	95	100	104	102	104	98	89	75	98	104	104
ADM***	27	23	27	26	39	56	69	55	40	79	85	82	82	73	60	41	58	70	55
MISSOULA, MONT.																			
0	-21	-33	-22	-33	-15	14	21	-13	-33	31	36	36	31	24	17	-23	-23	-23	-33
50	24	19	26	23	35	45	54	44	34	60	68	66	65	54	45	32	44	55	44
75	34	32	37	36	46	53	62	58	50	68	77	74	74	65	53	44	60	72	63
85	39	37	41	41	51	58	67	64	57	73	81	78	79	70	57	49	67	79	70
95	48	47	50	50	60	68	77	76	72	82	91	86	89	80	66	57	80	91	85
100	60	59	60	60	72	85	92	92	92	98	105	98	105	98	80	65	98	105	105
ADM***	32	29	36	32	46	58	68	57	45	75	86	84	82	71	58	41	57	69	57
MOBILE, ALA.																			
0	18	14	11	11	21	36	45	21	11	56	60	59	56	47	32	22	22	22	11
50	54	53	55	54	60	67	73	67	60	80	81	81	80	78	69	59	68	74	67
75	62	62	65	64	69	74	81	77	72	86	86	86	87	85	78	67	79	86	80
85	65	66	69	68	73	77	84	82	77	88	89	89	89	87	81	71	83	90	85
95	72	74	75	75	80	84	90	90	87	94	95	94	95	92	86	77	90	97	94
100	80	84	82	84	90	92	100	100	100	102	104	102	104	98	93	85	98	104	104
ADM***	63	62	65	63	69	76	83	76	70	89	89	90	89	87	79	69	78	84	77
MODESTO, CALIF.																			
0	15	18	24	15	28	30	37	28	15	39	46	47	39	40	29	26	26	26	15
50	46	44	49	46	54	59	66	60	53	71	76	74	74	71	63	52	62	68	60
75	54	52	57	56	61	67	74	69	64	71	84	82	83	79	72	60	72	79	72
85	59	56	62	61	65	72	78	74	70	76	88	86	87	84	77	64	77	84	78
95	68	66	73	73	73	81	88	86	83	88	97	95	97	94	88	74	90	95	91
100	84	81	92	92	87	95	105	105	105	111	111	111	111	110	106	90	110	111	111
ADM***	54	53	59	55	65	73	80	73	64	87	94	91	91	87	77	65	76	83	74
MOLINE, ILL.																			
0	-16	-20	-23	-23	-13	21	30	-13	-23	39	46	40	39	24	16	-2	-2	-2	-23
50	27	23	27	26	37	50	61	49	37	71	76	73	73	65	54	39	53	63	50
75	38	34	39	38	50	58	70	65	53	79	83	81	82	76	64	49	66	78	68
85	43	39	44	43	55	63	75	71	61	83	87	85	86	80	68	54	72	84	75
95	53	50	54	53	67	74	86	85	78	91	94	94	94	88	78	65	84	94	88
100	67	65	68	68	83	91	104	104	104	104	105	104	106	100	92	80	100	104	104
ADM***	84	81	92	86	87	95	105	96	91	108	111	111	110	110	106	90	102	104	98
MONCTON, N BRUNSWICK, CANADA																			
0	-25	-32	-33	-33	-25	4	20	-25	-33	25	35	31	25	24	14	-4	-4	-4	-33
50	22	16	16	18	27	37	50	38	28	58	66	64	63	56	46	35	44	54	41
75	33	28	28	31	39	47	58	53	44	67	74	73	72	65	55	45	58	68	59
85	39	34	34	37	44	52	63	60	51	71	77	77	77	69	59	49	64	74	66
95	50	46	44	48	53	64	74	73	67	80	85	86	86	78	68	59	75	85	80
100	65	63	59	65	66	83	91	91	91	94	96	99	99	92	83	73	92	99	99
ADM***	30	25	25	27	35	46	61	47	37	69	77	76	74	67	56	42	55	64	51
MONROE, LA.																			
0	16	5	-2	-2	15	32	42	15	-2	54	55	58	54	37	29	19	19	19	-2
50	49	48	51	49	57	65	73	65	57	80	82	83	82	74	67	55	64	74	65
75	58	58	63	61	67	73	80	77	71	87	89	89	89	86	76	64	77	86	81
85	62	63	67	65	71	77	83	81	76	89	92	92	92	89	79	68	82	91	86
95	70	71	75	74	79	84	89	88	86	94	97	98	98	95	86	75	91	99	96
100	82	83	83	83	90	93	97	97	97	101	105	107	107	103	94	86	103	107	107
ADM***	60	58	61	60	68	77	84	76	68	91	93	94	93	89	81	67	79	86	77
MONTENEY, CALIF.																			
0	19	18	22	18	25	28	29	25	18	32	35	35	32	32	26	20	20	20	18
50	50	49	51	50	54	56	59	56	53	60	62	62	61	62	60	55	59	60	57
75	59	57	59	59	62	64	67	65	63	69	70	69	70	71	69	64	70	71	68
85	63	61	63	64	66	68	72	70	68	74	75	73	75	74	75	69	75	77	73
95	71	70	74	74	77	79	83	81	80	86	85	82	86	88	86	80	88	88	84
100	84	82	90	90	93	97	100	100	100	105	102	95	105	107	105	94	107	107	107
ADM***	63	61	62	62	66	68	71	68	65	72	74	73	73	76	74	70	73	73	69
MONTGOMERY, ALA.																			
0	8	5	-5	-5	20	30	43	20	-5	48	61	58	48	45	26	13	13	13	-5
50	49	49	52	50	57	65	73	65	57	80	81	81	81	77	66	55	64	73	65
75	59	60	64	63	66	73	80	75	72	87	87	87	86	85	76	65	79	87	81
85	64	64	69	67	70	76	83	80	77	91	90	90	92	89	80	69	84	91	87
95	72	72	76	75	79	83	90	88	87	97	96	95	98	96	89	77	94	99	97
100	83	83	84	84	90	92	99	99	99	104	107	104	107	104	100	86	104	107	107
ADM***	60	60	63	61	69	77	84	76	69	91	91	91	91	88	79	67	78	84	77

PROB	DEC	JAN	FEB	1QT*	MAR	APR	MAY	2QT	1MF**	JUN	JUL	AUG	3QT	SEP	OCT	NOV	4QT	2HF	ANN
<b>MONTPELIER, VT.</b>																			
0	-19	-25	-26	-26	-18	10	23	-18	-26	34	39	37	34	25	17	-7	-7	-7	-26
50	22	19	18	20	29	41	52	41	30	63	67	64	65	56	47	35	46	55	43
75	32	31	29	32	41	50	60	55	45	70	75	71	73	64	55	46	59	70	59
85	37	36	34	37	47	54	64	60	51	74	78	75	76	68	60	51	64	75	66
95	47	48	43	49	59	62	72	71	65	81	84	82	83	76	69	61	74	84	78
100	61	66	56	66	77	76	84	84	84	91	94	93	94	88	84	76	88	94	94
ADM***	31	29	29	30	39	52	64	51	40	75	80	76	77	68	59	43	57	67	54
<b>MONTREAL, QUE.</b>																			
0	-29	-27	-28	-29	-20	2	23	-20	-29	38	46	43	38	32	20	-18	-18	-18	-29
50	20	14	16	18	26	42	56	41	29	66	70	67	67	59	47	33	46	57	43
75	31	24	26	28	38	52	64	56	44	73	76	74	75	66	54	45	61	73	60
85	36	29	30	33	45	57	69	63	52	76	79	77	78	70	58	50	67	79	67
95	46	39	39	43	53	67	79	76	68	83	86	84	86	78	67	59	77	88	80
100	59	54	51	59	68	83	94	94	94	94	97	96	97	90	80	70	90	97	97
ADM***	26	21	23	23	33	50	64	49	36	74	78	75	76	67	54	39	53	64	50
<b>MUSCLE SHOALS, ALA.</b>																			
0	9	1	1	1	10	29	36	10	1	48	54	53	48	39	27	2	2	2	1
50	44	44	45	44	52	62	70	61	53	78	80	79	79	72	63	50	62	71	72
75	53	54	55	55	62	69	78	73	65	86	87	86	87	81	72	62	74	84	76
85	57	58	59	59	66	73	82	78	71	89	90	89	90	84	75	66	81	91	82
95	65	68	67	68	73	80	89	87	83	95	96	95	97	91	83	73	90	99	92
100	78	80	77	80	83	89	99	99	99	104	106	105	106	101	94	82	101	106	106
ADM***	53	53	54	53	62	72	81	72	62	89	91	90	90	83	75	61	73	81	72
<b>MUSKEGON, MICH.</b>																			
0	-4	-13	-11	-13	-10	15	22	-10	-13	34	40	40	34	28	22	-14	-14	-14	-14
50	29	25	25	26	32	44	54	43	35	64	70	68	68	61	50	39	50	59	47
75	38	35	33	36	43	52	63	56	47	72	77	76	76	70	58	51	65	75	62
85	42	39	37	41	49	56	66	62	53	76	80	79	79	74	62	55	71	80	68
95	50	49	45	50	60	67	74	72	66	84	87	86	87	82	70	63	82	89	80
100	63	63	57	63	77	84													

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## SURFACE RELIABILITY TEMPERATURE IN DEGREES FAHRENHEIT FOR GIVEN PROBABILITIES OF NOT BEING EXCEEDED

PROB	DEC	JAN	FEB	1QT*	MAR	APR	MAY	2QT	1HF**	JUN	JUL	AUG	3QT	SEP	OCT	NOV	4QT	2HF	ANN
PADUCAH, KY.																			
0	-3	-17	-12	-17	6	25	30	6	-17	45	47	45	45	32	23	1	1	1	-17
50	38	37	39	38	47	58	67	57	48	77	79	78	78	71	61	47	40	49	58
75	48	50	51	51	58	67	76	70	63	85	87	87	87	81	70	58	74	84	76
85	53	55	56	56	63	71	80	75	69	98	91	91	91	85	75	63	80	90	83
95	63	65	65	66	74	80	87	85	82	95	98	99	99	94	83	73	91	100	96
100	78	79	77	79	90	94	98	98	98	105	109	112	112	106	95	86	106	112	112
ADM***	47	46	49	47	58	69	79	69	58	88	91	90	90	84	74	58	72	81	69
PALM SPRINGS, CALIF.																			
0	26	18	24	18	29	35	38	29	18	48	54	54	48	46	30	26	26	26	18
50	55	54	57	55	63	70	76	69	62	82	91	89	87	84	74	63	73	80	71
75	64	64	67	66	72	79	86	81	75	91	100	98	97	93	85	72	86	93	85
85	68	69	72	72	77	84	91	86	81	96	103	101	101	98	89	76	91	99	91
95	78	80	85	84	88	94	102	99	95	106	111	109	110	107	98	85	103	109	104
100	93	98	105	105	105	110	118	118	118	121	122	121	122	121	110	98	121	122	122
ADM***	70	68	71	70	79	87	94	87	78	102	108	106	105	102	91	79	91	98	88
PANAMA CITY, FLA.																			
0	17	14	4	4	24	31	43	24	4	56	60	58	56	47	33	22	22	22	4
50	56	56	57	56	62	68	75	68	62	81	82	82	82	79	71	61	70	76	69
75	65	65	68	68	70	76	83	78	75	87	88	88	88	87	80	70	82	88	84
85	69	69	72	72	74	80	86	82	80	90	90	90	91	90	83	74	86	92	89
95	76	75	78	78	81	86	92	90	89	95	95	95	96	96	89	81	95	99	97
100	85	81	83	85	89	93	99	99	99	103	103	102	103	105	96	90	105	105	105
ADM***	66	66	67	66	72	78	85	78	72	90	90	91	90	89	83	72	81	86	79
PENDLETON, ORE.																			
0	1	-22	-18	-22	10	18	25	10	-22	36	42	45	36	33	11	-6	-6	-6	-22
50	35	31	37	34	45	52	60	52	43	67	75	73	71	65	54	41	53	62	53
75	44	43	49	47	54	61	69	64	59	75	83	80	81	73	64	52	67	78	71
85	47	48	53	51	58	66	74	69	66	79	87	83	85	78	68	56	74	84	78
95	55	56	59	59	66	75	84	81	80	88	96	91	95	87	75	63	86	96	92
100	65	67	65	67	78	89	99	99	99	101	110	102	110	102	85	72	102	110	110
ADM***	41	37	44	41	55	63	72	63	52	79	89	87	85	77	64	47	63	74	63
PENSACOLA, FLA.																			
0	20	14	13	13	24	34	47	24	13	59	64	63	59	50	39	22	22	22	13
50	55	54	56	55	60	67	74	67	61	80	81	81	81	78	70	60	70	75	68
75	63	63	65	64	69	75	81	77	73	85	86	86	86	85	78	69	80	87	81
85	66	66	69	68	72	78	84	81	78	87	88	89	89	87	81	72	84	91	85
95	72	72	74	73	79	84	90	90	87	92	93	94	95	91	86	77	90	97	94
100	78	79	79	79	88	91	100	100	100	100	101	103	103	95	93	83	95	103	102
ADM***	62	61	63	62	67	73	80	73	68	86	87	87	87	85	78	68	77	82	75
PENTICTON, B. C., CANADA.																			
0	-8	-12	-12	-12	5	16	27	5	-12	32	38	32	32	22	12	1	1	1	-12
50	31	27	31	29	40	48	56	48	38	63	69	67	66	58	48	38	48	57	48
75	40	36	41	39	48	57	64	59	52	71	77	75	75	67	57	46	60	71	63
85	43	40	45	44	52	61	69	65	58	76	81	79	80	72	61	50	65	77	70
95	51	47	53	52	60	71	78	76	72	85	90	86	90	81	70	58	77	89	84
100	60	57	64	64	71	87	94	94	94	100	105	97	105	94	82	69	94	105	105
ADM***	35	32	38	35	50	61	70	60	48	77	84	81	81	71	59	44	58	69	58
PHILADELPHIA, PA.																			
0	1	2	3	1	1	24	33	7	1	44	52	50	44	36	28	15	15	15	1
50	36	33	34	34	42	52	63	52	43	72	76	74	74	68	57	46	57	65	54
75	45	42	42	43	52	60	71	64	55	79	83	80	82	76	65	54	68	77	68
85	49	47	47	48	57	64	75	69	61	85	86	84	85	80	69	58	73	82	73
95	58	57	57	58	69	75	83	80	75	90	92	90	92	88	79	66	84	91	85
100	72	74	74	74	87	92	96	96	96	100	102	101	102	100	96	79	100	102	102
ADM***	44	41	42	42	52	62	74	63	53	83	87	84	84	78	67	55	67	75	64
PHOENIX, ARIZ.																			
0	22	17	22	17	29	32	42	29	17	50	61	60	50	49	36	25	25	25	17
50	52	50	54	52	60	67	76	67	60	84	90	88	87	83	71	58	71	79	69
75	60	58	63	61	68	76	84	78	72	93	97	95	96	92	80	67	83	92	83
85	64	62	67	65	72	81	89	83	78	97	101	99	100	96	84	71	88	97	88
95	74	71	75	74	80	90	98	95	91	105	107	105	107	105	92	79	100	106	101
100	88	85	88	88	92	104	113	113	113	117	116	115	117	118	104	91	118	118	118
ADM***	68	65	70	67	76	84	94	84	76	102	105	102	103	98	88	76	87	95	85
PIERRE, S. DAK.																			
0	-27	-36	-40	-40	-18	1	20	-18	-40	35	44	39	35	19	-4	-16	-16	-16	-40
50	23	17	20	20	32	48	59	46	33	69	76	75	74	64	52	34	50	62	48
75	36	31	35	35	45	60	70	62	52	78	87	85	84	76	65	47	66	80	69
85	42	37	42	42	52	65	75	69	61	83	91	89	89	81	71	53	74	87	77
95	56	49	56	56	67	77	87	84	79	94	100	99	99	92	82	64	88	100	94
100	76	66	75	76	90	94	105	105	105	110	115	114	115	108	98	81	108	115	115
ADM***	33	28	31	31	42	60	72	58	44	81	91	89	87	78	65	45	63	75	60
PITTSBURGH, PA.																			
0	5	-6	-7	-7	12	20	32	12	-7	43	49	46	43	34	28	9	9	9	-7
50	31	29	30	30	39	49	60	49	39	69	72	70	70	65	53	41	53	62	51
75	38	38	39	40	46	57	67	59	52	75	79	77	77	73	60	49	64	74	65
85	42	41	44	44	50	61	70	63	57	78	82	80	81	77	63	53	70	79	71
95	51	49	54	54	58	71	77	73	69	85	88	87	88	85	71	61	81	88	83
100	66	60	69	69	72	87	87	87	87	94	99	97	99	97	83	72	97	99	99
ADM***	38	37	38	38	48	59	71	59	48	79	83	81	81	75	63	49	62	72	60
PITTSFIELD, MASS.																			
0	-20	-22	-25	-25	-9	11	25	-9	-25	33	41	32	32	24	18	-9	-9	-9	-25
50	25	21	22	23	31	42	54	42	32	63	68	66	65	58	48	37	48	57	44
75	36	32	33	34	42	51	62	55	47	71	74	74	74	67	56	48	61	71	61
85	40	37	38	39	48	56	66	61	54	74	77	78	77	72	60	53	67	76	67
95	49	47	47	48	60	67	75	72	68	82	83	85	84	81	69	63	79	86	80
100	61	61	60	61	81	86	88	88	88	93	92	94	94	95	84	76	95	95	95
ADM***	33	30	31	31	40	53	66	53	42	74	79	78	77	70	59	46	58	68	58

[illegible][illegible]

NO. DO-7176

**SURFACE RELIABILITY TEMPERATURE IN DEGREES FAHRENHEIT FOR GIVEN PROBABILITIES OF NOT BEING EXCEEDED**

PROB	DEC	JAN	FEB	1QT*	MAR	APR	MAY	2QT	1HF**	JUN	JUL	AUG	3QT	SEP	OCT	NOV	4QT	2HF	ANN
RALEIGH, N. C.																			
0	0	2	-3	-2	13	23	32	13	-2	44	53	49	44	37	25	14	14	14	-2
50	42	41	43	42	50	59	67	59	50	76	79	77	77	73	61	50	61	69	60
75	53	51	54	53	60	68	76	70	64	84	85	84	85	81	70	60	73	82	74
85	57	56	59	58	65	72	80	75	70	87	88	87	89	85	75	64	78	87	80
95	66	66	69	68	76	81	88	85	82	94	95	94	96	93	84	74	89	95	91
100	79	80	82	82	94	95	99	99	99	104	105	103	105	104	98	88	104	105	105
ADM***	52	51	53	52	62	71	79	71	61	87	89	88	88	84	73	62	73	80	71
RAPID CITY, S. DAK.																			
0	-18	-27	-18	-27	-15	9	18	-15	-27	31	40	40	31	25	14	-14	-14	-14	-27
50	26	21	24	24	31	45	55	43	34	64	72	71	69	61	49	35	48	59	46
75	37	34	35	37	44	54	64	58	49	72	81	79	79	70	59	47	64	76	64
85	42	40	41	43	50	59	69	64	56	77	85	83	84	75	64	53	70	82	72
95	53	53	54	55	62	71	78	76	71	86	95	92	94	86	76	63	84	94	87
100	70	74	74	74	82	89	93	93	93	101	109	106	109	103	94	77	103	109	109
ADM***	37	33	36	35	43	57	67	55	45	76	86	85	82	74	62	47	61	71	58
READING, PA.																			
0	-6	-14	-13	-14	2	12	31	2	-14	43	48	46	43	32	24	10	10	10	-14
50	35	32	33	33	42	51	63	52	43	71	76	73	73	67	56	45	56	65	54
75	45	44	44	45	52	62	71	64	57	79	83	81	81	76	65	55	68	78	70
85	49	49	50	50	58	67	75	69	63	82	86	84	85	80	69	59	74	83	76
95	58	61	61	61	69	78	83	80	76	90	93	93	93	89	79	69	85	93	89
100	71	77	77	77	87	94	95	95	95	102	103	105	105	102	94	84	102	105	105
ADM***	41	39	40	40	50	61	73	61	51	81	85	83	83	77	66	53	65	74	62
REGINA, SASK., CAN.																			
0	-55	-54	-56	-56	-44	-20	7	-44	-56	23	28	23	23	9	-15	-47	-47	-47	-56
50	8	-1	2	3	17	38	51	35	19	60	65	63	63	52	40	22	38	50	34
75	23	12	16	18	32	52	63	54	39	70	75	73	73	63	53	38	57	72	56
85	29	18	23	25	39	59	68	62	48	75	80	78	78	68	59	44	65	80	65
95	42	31	35	39	54	71	80	78	68	86	91	88	90	80	71	57	80	93	83
100	59	48	53	59	76	89	9												

•IQT--FIRST QUARTER DEC-JAN-FEB  
••IMF--FIRST HALF YEAR DEC---MAY  
•••ADM--AVERAGE DAILY MAXIMUM

PROB	DEC	JAN	FEB	1QT	MAR	APR	MAY	2QT	1HF	JUN	JUL	AUG	3QT	SEP	OCT	NOV	4QT	2HF	ANN
ROSWELL, N. MEX.																			
0	-3	-15	-8	-15	-5	24	36	-5	-15	45	55	55	45	38	26	7	7	7	-15
50	41	40	45	42	51	60	68	59	51	77	79	78	78	71	61	48	60	69	60
75	52	52	57	55	63	69	77	76	66	85	86	84	86	80	70	59	73	83	77
85	56	58	62	61	68	73	81	80	73	89	89	87	90	84	74	63	78	88	83
95	66	67	72	71	77	82	90	91	86	97	96	94	97	92	82	73	89	98	95
100	79	79	84	84	87	94	103	103	103	108	108	104	108	103	93	86	103	108	108
ADM***	55	54	60	56	66	75	83	75	65	91	92	91	91	85	75	64	74	85	74
ROUYN-NORANDA, QUEBEC, CANADA																			
0	-30	-33	-32	-33	-20	-10	15	-20	-33	29	34	36	29	28	15	-3	-3	-3	-33
50	13	5	7	8	15	37	48	33	20	61	64	55	60	50	44	25	39	50	35
75	24	12	16	19	24	48	57	47	35	69	72	62	69	57	52	32	51	63	52
85	29	16	21	24	28	52	61	53	43	73	75	66	73	61	55	36	57	68	59
95	39	24	31	35	38	60	71	66	59	81	82	77	81	72	64	45	70	80	74
100	52	34	46	52	52	71	86	86	86	92	92	95	95	90	78	59	90	95	95
ADM***	22	14	17	18	28	48	60	45	31	73	75	70	73	60	45	31	45	59	45
SAGINAW, MICH.																			
0	-12	-17	-23	-23	-8	8	24	-8	-23	33	40	38	33	27	19	-3	-3	-3	-23
50	27	24	23	25	32	45	56	44	35	67	72	70	69	62	51	38	50	60	47
75	37	34	35	37	44	55	65	58	50	76	81	78	79	71	59	48	63	75	65
85	42	39	40	42	49	60	70	64	57	80	85	82	84	75	64	53	69	81	72
95	52	48	51	52	62	71	80	77	72	90	95	90	95	85	73	64	82	94	88
100	66	62	67	67	83	89	95	95	95	104	111	103	111	100	88	80	100	111	111
ADM***	34	31	31	32	40	55	68	54	43	78	84	81	81	72	61	45	59	70	57
ST. JOHN, N. B., CAN.																			
0	-21	-21	-20	-21	-10	6	26	-10	-21	35	41	42	35	31	20	-9	-9	-9	-21
50	25	20	20	21	29	28	49	35	28	57	62	62	60	56	48	37	47	53	41
75	35	30	29	32	39	35	56	47	42	63	67	67	67	63	55	47	60	67	56
85	39	34	33	36	43	40	60	53	48	66	70	70	70	68	59	50	66	73	62
95	47	43	41	44	51	53	70	67	63	75	78	78	78	77	69	57	77	82	75
100	56	55	50	56	62	75	87	87	87	88	89	90	90	93	84	63	93	93	

THE BOEING COMPANY  
TRANSPORT DIVISION

NO. D6-7176

**SURFACE RELIABILITY TEMPERATURE IN DEGREES FAHRENHEIT FOR GIVEN PROBABILITIES OF NOT BEING EXCEEDED**

PROB	DEC	JAN	FEB	1QT*	MAR	APR	MAY	2QT	1HF**	JUN	JUL	AUG	3QT	SEP	OCT	NOV	4QT	2HF	ANN
SAN ANTONIO, TEXAS.																			
0	14	0	6	0	21	34	44	21	0	58	65	63	58	41	34	25	25	25	0
50	53	51	55	53	61	49	74	69	61	82	84	84	84	79	71	60	70	77	69
75	63	62	67	65	71	77	84	80	75	88	89	90	90	88	80	68	81	88	84
85	67	67	71	70	76	81	87	84	80	91	92	92	93	91	83	72	85	92	89
95	77	76	80	80	85	89	93	92	90	97	97	98	98	96	89	80	93	99	98
100	90	87	91	91	97	99	101	101	101	105	106	106	106	102	95	91	102	106	106
ADM***	64	61	66	64	73	80	87	80	72	92	95	96	94	90	83	71	81	88	80
SAN DIEGO, CALIF.																			
0	36	29	36	29	41	41	48	41	29	50	55	57	50	51	45	40	40	40	29
50	57	55	56	56	58	61	63	61	58	66	69	70	68	69	65	61	65	67	62
75	63	62	62	63	63	66	69	67	67	71	73	75	74	75	71	67	72	74	72
85	66	66	66	67	67	70	72	71	71	74	76	78	77	78	74	71	77	79	74
95	73	74	74	75	74	78	81	80	81	83	81	85	85	88	82	80	87	88	87
100	85	88	88	88	86	92	94	94	94	97	89	98	98	104	94	96	104	104	104
ADM***	66	64	65	65	67	68	70	68	67	72	76	77	75	76	73	71	73	74	70
SANDSPIT, N.C., CANADA																			
0	14	7	10	7	10	27	31	10	7	37	42	42	37	35	28	22	22	22	7
50	37	34	36	36	38	42	48	42	39	53	57	58	56	55	47	41	48	52	46
75	43	40	42	43	44	46	53	51	47	57	61	63	61	60	52	46	54	59	55
85	45	43	45	45	46	49	55	54	51	60	63	65	64	62	54	49	57	63	59
95	50	48	49	50	50	55	61	61	59	66	69	71	70	66	59	53	63	70	68
100	56	54	54	56	54	66	71	71	71	77	79	80	80	71	66	60	71	80	80
ADM***	42	38	41	40	43	47	53	48	44	58	61	63	61	61	53	46	53	57	50
SAN FRANCISCO-OAKLAND, CALIF.																			
0	20	24	25	20	30	31	36	30	20	41	43	42	41	38	34	25	25	25	20
50	49	48	51	49	53	54	57	54	52	60	60	61	60	62	59	54	59	59	56
75	56	54	58	57	59	61	63	62	61	66	67	66	67	69	67	62	68	69	66
85	60	57	61	60	63	65	67	66	66	71	72	70	72	74	71	66	73	74	71
95	68	63	68	67	71	73	77	77	77	82	83	78	83	84	80	73	84	84	84
100	74	72	78	78	85	88	94	94	94	101	104	92	104	102	94	84	102	104	104
ADM***	57	56	59	57	61	63	65	63	60	69	69	70	69	72	69	64	69	69	65
SANTA BARBARA, CALIF.																			
0	28	26	31	26	33	33	39	33	26	41	45	43	41	42	37	31	31	31	26
50	53	51	53	52	55	58	60	57	55	62	65	65	64	65	61	57	61	62	59
75	60	58	59	60	61	65	66	64	63	68	71	71	70	71	69	64	69	71	68
85	64	62	63	64	65	68	69	68	67	71	74	74	74	75	73	68	74	75	72
95	73	71	71	73	73	77	77	76	76	78	83	80	83	83	83	77	83	84	83
100	87	84	84	87	87	90	90	90	90	90	97	90	97	97	99	92	99	99	99
ADM***	65	64	64	64	66	67	70	68	66	72	74	74	73	75	72	70	72	73	69
SANTA FE, N. MEXICO.																			
0	-7	-11	-16	-16	0	14	26	0	-16	39	47	45	39	31	20	-4	-4	-4	-16
50	31	29	35	32	39	49	58	49	40	67	72	70	70	64	53	39	52	61	50
75	40	39	46	43	49	58	67	61	54	74	78	77	77	72	61	49	65	75	64
85	44	43	50	47	53	62	71	66	61	77	81	80	81	75	65	53	70	80	72
95	52	52	57	55	63	70	79	77	74	84	88	85	87	82	73	61	80	89	83
100	62	64	65	65	76	82	92	92	92	95	97	94	97	92	85	71	92	97	97
ADM***	44	41	47	44	53	64	73	63	54	82	86	84	84	78	67	53	66	75	64
SARASOTA, FLORIDA.																			
0	25	24	27	24	29	38	46	29	24	57	63	66	57	59	42	28	28	28	24
50	63	62	63	63	66	70	75	70	66	79	80	80	79	79	74	67	73	74	71
75	72	71	71	72	74	78	81	79	76	84	84	84	85	84	81	75	83	84	82
85	75	74	74	75	77	81	84	83	80	86	86	85	87	85	83	78	86	90	85
95	80	80	79	81	83	86	88	88	86	90	90	89	91	89	87	83	90	94	91
100	85	88	85	88	90	93	94	94	94	96	96	95	94	93	91	88	93	94	96
ADM***	74	73	74	74	77	82	86	81	78	88	89	89	88	87	84	77	83	86	82
SASKATOON, SASK., CANADA.																			
0	-41	-55	-49	-55	-34	-9	9	-34	-55	26	31	28	26	12	-14	-31	-31	-31	-55
50	7	-1	3	3	17	38	51	35	19	60	65	62	62	51	39	22	37	49	34
75	20	13	16	18	30	50	62	52	38	69	74	71	72	61	52	35	53	68	56
85	26	19	22	24	37	56	68	60	48	74	78	75	76	64	59	40	60	75	64
95	39	32	35	38	51	70	80	76	68	86	88	85	87	76	71	52	74	88	81
100	58	50	55	58	73	91	99	99	99	104	104	100	104	92	90	68	92	104	104
ADM***	16	9	13	13	27	49	64	47	30	71	77	75	74	63	51	31	48	61	45
SAULT STE. MARIE, ONT. CANADA																			
0	-34	-42	-39	-42	-29	-40	16	-40	-42	22	30	26	22	17	8	27	8	8	-42
50	20	15	14	14	23	37	49	36	26	59	63	62	61	55	45	32	44	53	40
75	33	27	26	30	36	53	58	54	43	68	72	71	71	65	55	36	54	64	59
85	37	31	30	35	42	59	63	61	51	72	76	75	76	69	59	40	60	70	66
95	46	38	38	44	54	69	72	73	66	81	85	84	85	78	68	51	72	82	81
100	55	45	46	55	70	79	87	87	87	94	99	97	99	92	82	71	92	99	99
ADM***	28	25	24	26	33	47	62	47	36	72	76	75	74	66	55	39	53	64	50
SAVANNAH, GA.																			
0	12	12	8	8	24	33	44	24	8	49	61	60	49	46	28	15	15	15	8
50	52	52	53	52	59	66	73	66	59	79	81	80	80	77	67	58	67	74	66
75	61	61	64	63	68	74	80	76	71	86	87	86	88	84	76	67	79	87	80
85	65	65	68	67	72	77	84	80	77	89	89	89	91	87	80	71	84	91	85
95	73	73	74	75	81	84	91	89	87	95	96	95	97	94	86	78	92	98	94
100	83	84	85	85	94	94	101	101	101	103	105	104	105	102	94	86	102	105	105
ADM***	63	62	64	63	70	77	84	77	70	90	91	90	90	86	78	69	77	84	77
SCRANTON, PA.																			
0	-13	-15	-19	-19	-1	8	27	-1	-19	38	44	38	38	30	21	6	6	6	-19
50	30	27	27	28	36	47	59	47	38	68	72	70	70	63	52	41	52	61	49
75	40	38	39	40	47	57	67	60	52	76	80	78	78	72	61	50	64	74	66
85	45	43	45	45	52	63	71	65	59	79	83	82	82	76	65	55	70	79	73
95	55	53	56	57	64	74	80	77	73	87	91	90	91	84	75	65	82	90	86
100	69	69	74	74	84	91	93	93	93	99	103	102	103	100	91	81	100	103	103
ADM***	37	34	35	35	43	57	70	57	46	79	83	81	81	74	62	48	61	71	55

\*1QT--FIRST QUARTER DEC-JAN-FEB  
 \*\*INF--FIRST HALF YEAR DEC---MAY  
 \*\*\*ADM--AVERAGE DAILY MAXIMUM

THE BOEING COMPANY  
TRANSPORT DIVISION

NO. DA-7176  
PAGE 173

SURFACE RELIABILITY TEMPERATURE IN DEGREES FAHRENHEIT FOR GIVEN PROBABILITIES OF NOT BEING EXCEEDED

PROB	DEC	JAN	FEB	1QT*	MAR	APR	MAY	2QT	1HF**	JUN	JUL	AUG	3QT	SEP	OCT	NOV	4QT	2HF	ANN
SEATTLE, WASH.																			
0	16	0	1	0	11	29	28	11	0	38	43	44	38	34	28	4	6	6	0
50	40	37	41	39	45	49	55	50	44	60	64	64	62	59	52	44	51	57	51
75	46	46	50	48	53	55	62	59	56	67	70	69	69	65	58	53	62	69	63
85	48	49	53	52	54	59	66	64	61	71	74	73	73	68	61	57	67	74	69
95	54	54	59	58	63	67	74	73	72	80	82	80	82	76	69	64	76	84	80
100	61	60	66	66	72	82	87	87	87	96	96	92	96	88	80	74	88	96	96
ADM***	45	43	48	45	52	58	65	58	52	70	75	74	73	68	59	50	59	66	59
SEVEN ISLANDS, QUE., CANADA																			
0	-33	-46	-37	-46	-25	-12	11	-25	-46	27	35	31	27	23	9	-20	-20	-20	-46
50	12	3	7	7	18	31	42	30	19	52	59	58	56	49	39	27	38	47	33
75	23	15	18	20	28	41	50	44	35	59	66	65	64	57	47	37	52	63	52
85	28	20	25	26	33	44	55	50	43	63	69	68	68	61	50	42	58	68	59
95	37	29	35	37	41	50	66	64	59	73	77	76	77	70	59	49	70	78	73
100	49	41	51	51	53	57	83	83	83	90	90	87	90	85	72	59	85	90	90
ADM***	21	14	16	17	28	39	50	39	28	61	68	67	65	58	47	34	46	56	42
SHARON PA.																			
0	-10	-12	-20	-20	-6	16	25	-6	-20	37	46	38	37	29	20	6	6	6	-20
50	32	31	30	31	39	50	62	50	41	72	76	73	74	66	55	42	54	64	52
75	42	42	42	44	51	60	71	64	56	81	83	81	83	76	64	52	67	78	70
85	47	47	48	49	56	65	75	70	62	85	87	85	87	80	68	56	72	83	77
95	56	58	59	60	69	75	83	81	76	94	95	91	96	89	77	66	84	94	90
100	68	75	76	76	87	92	95	95	95	107	108	100	108	101	90	82	101	108	108
ADM***	39	39	38	39	49	62	75	62	50	84	88	85	86	79	66	50	65	75	63
SHERIDAN, WYO.																			
0	-24	-30	-31	-31	-20	2	13	-20	-31	27	40	38	27	26	8	-18	-18	-18	-31
50	24	20	23	22	32	44	53	45	33	61	71	69	67	58	47	33	46	56	44
75	36	33	37	36	44	54	63	58	49	71	79	77	77	67	57	46	62	74	63
85	42	39	43	42	50	59	68	64	56	75	83	81	82	72	62	51	68	80	70
95	54	51	55	55	61	70	79	77	72	85	92	90	92	83	73	62	82	92	84
100	71	70	73	73	76	87	95	95	95	100	106	105	106	100	89	76	100	106	106
ADM***	37	33	36	35	43	56	66	55	45	75	86	84	82	73	61	46	60	71	58
SHREVEPORT, LA.																			
0	17	16	18	16	25	36	44	25	16	55	65	58	55	50	31	25	25	25	16
50	50	48	52	50	58	67	74	66	58	81	84	84	83	79	69	56	68	75	67
75	58	56	61	59	67	75	81	76	69	87	89	91	90	84	77	64	78	87	79
85	62	60	64	63	70	78	83	80	73	90	91	93	93	89	81	68	83	91	84
95	71	68	72	71	78	83	89	87	82	95	97	98	98	95	88	76	91	98	93
100	84	81	83	84	89	91	95	95	95	101	106	105	106	103	97	88	103	106	106
ADM***	58	56	60	58	68	77	83	76	67	91	93	95	93	89	80	66	78	86	76
SIOUX CITY, IOWA.																			
0	-18	-24	-25	-24	-19	15	26	-19	-24	38	47	37	37	24	17	-7	-7	-7	-24
50	23	19	23	22	35	49	60	48	35	70	76	74	73	64	53	36	51	62	49
75	34	31	35	34	49	59	69	64	50	79	84	83	83	74	62	46	65	78	66
85	39	36	40	39	55	63	73	70	57	83	88	86	87	79	67	52	71	84	73
95	49	49	50	51	69	74	82	81	73	92	95	94	95	88	77	62	84	95	88
100	63	68	64	68	89	90	95	95	95	106	107	104	107	101	93	78	101	107	107
ADM***	33	29	33	32	45	61	72	59	46	82	88	85	85	77	65	46	62	74	60
SIOUX FALLS, S. DAK.																			
0	-25	-26	-27	-27	-23	11	20	-23	-27	33	44	34	33	24	13	-10	-10	-10	-27
50	19	14	20	18	32	46	58	45	32	68	75	72	72	62	50	32	48	60	46
75	31	25	31	29	46	56	68	62	47	77	83	82	82	72	60	43	63	76	64
85	36	30	37	35	51	61	72	68	54	81	87	86	86	77	65	48	69	82	71
95	46	42	49	47	63	73	81	80	70	89	95	94	95	86	76	59	81	94	87
100	61	59	66	66	80	91	94	94	94	101	108	105	108	99	92	75	99	108	108
ADM***	29	24	30	28	42	59	71	57	43	80	88	85	84	75	63	43	60	72	57
SMITHERS, B.C., CANADA																			
0	-30	-47	-32	-47	-28	-1	19	-28	-47	29	30	28	28	20	4	-25	-25	-25	-47
50	19	16	21	19	31	40	49	40	29	55	59	57	57	51	40	29	40	48	39
75	31	29	33	33	43	50	57	56	47	62	67	65	65	59	49	41	55	65	58
85	35	34	37	38	47	54	62	62	55	66	70	70	69	63	53	45	61	71	66
95	42	41	44	45	53	62	72	74	69	76	79	79	78	72	61	52	72	82	79
100	50	48	52	52	58	73	88	88	88	92	92	93	93	86	72	59	86	93	93
ADM***	26	24	31	27	41	51	62	51	39	67	70	70	69	63	49	35	49	59	49
SOUTH BEND, IND.																			
0	-16	-22	-17	-22	-13	18	25	-13	-22	35	45	41	35	29	23	-7	-7	-7	-22
50	28	25	26	26	36	47	58	47	37	69	73	71	71	65	53	39	52	62	49
75	38	36	37	38	48	56	67	62	52	77	81	79	80	74	61	50	66	77	66
85	43	42	42	43	53	61	72	68	59	81	84	83	84	78	65	55	72	82	73
95	52	52	52	54	65	72	81	79	73	89	91	90	91	86	74	66	84	92	85
100	64	68	67	68	81	91	95	95	95	100	101	100	101	99	88	82	99	101	101
ADM***	35	32	34	33	44	58	70	57	45	80	85	82	82	75	63	46	61	72	58
SPARTANBURG, S. C.																			
0	9	5	9	5	14	28	39	14	5	51	55	55	51	41	29	11	11	11	5
50	44	43	45	44	52	61	69	60	52	77	79	78	78	73	62	51	62	70	61
75	53	53	54	54	61	69	76	72	64	84	85	84	85	81	71	61	74	83	75
85	57	58	58	58	65	72	80	76	70	87	88	86	88	85	75	65	79	88	80
95	65	67	67	67	74	80	87	86	81	94	94	92	94	91	83	73	89	96	90
100	78	80	78	80	87	90	98	98	98	104	103	101	104	101	95	83	101	104	104
ADM***	53	52	55	53	62	71	80	71	62	88	89	87	88	83	73	61	72	80	71
SPOKANE, WASH.																			
0	-9	-24	-12	-24	-3	21	24	-3	-24	35	40	42	35	30	20	-11	-11	-11	-24
50	29	25	30	28	38	46	55	46	37	61	70	68	66	59	49	36	48	57	47
75	38	36	39	39	48	54	63	59	52	69	77	75	75	67	56	46	62	73	64
85	41	39	43	43	52	58	67	64	59	73	81	78	79	72	60	50	68	78	71
95	47	45	49	49	59	68	76	74	72	82	89	86	87	81	68	55	80	89	84
100	54	51	55	55	68	84	90	90	90	96	100	98	100	96	80	61	96	100	100
ADM***	34	30	36	33	46	56	66	54	45	72	82	81	70	71	58	42	57	68	55

PROG	DEC	JAN	FEB	1QT*	MAR	APR	MAY	2QT	1MF**	JUN	JUL	AUG	3QT	SEP	OCT	NOV	4QT	2MF	ANN
SPRINGFIELD, ILL.																			
0	-12	-14	-15	-15	-8	22	30	-8	-15	43	50	44	43	35	17	-2	-2	-2	-15
50	31	27	31	30	40	52	62	51	40	72	76	74	74	67	56	41	55	64	52
75	41	38	42	41	52	60	70	65	54	80	84	81	83	75	66	52	68	80	69
85	46	43	47	46	57	64	74	71	61	83	88	84	87	79	70	57	74	86	76
95	57	54	57	57	68	73	82	81	74	91	97	90	97	87	80	67	85	98	91
100	72	71	71	72	83	88	93	93	93	103	112	98	112	100	93	83	100	112	112
ADM***	38	35	39	38	50	62	73	61	50	83	87	85	85	78	67	50	65	75	62
SPRINGFIELD, MO.																			
0	-4	-4	-11	-11	-3	18	35	-3	-11	45	52	46	45	36	21	7	7	7	-11
50	36	33	37	35	45	56	64	55	45	73	78	77	76	69	58	45	57	66	56
75	46	43	49	47	57	65	71	68	59	80	85	84	84	78	68	54	70	81	72
85	51	48	54	52	62	69	74	73	64	83	89	87	88	82	72	58	76	87	79
95	61	59	64	63	72	79	81	82	76	91	98	94	98	91	80	67	87	98	93
100	77	76	79	79	86	92	92	92	92	101	113	103	113	104	92	80	104	113	113
ADM***	44	42	47	44	55	66	74	65	55	83	88	87	86	79	69	54	67	77	66
STEPHENVILLE, NFLD., CANADA																			
0	1	-15	-17	-17	-9	11	21	-9	-17	30	40	40	30	31	25	10	10	10	-17
50	26	22	18	22	25	35	44	35	28	52	60	60	57	54	45	36	45	51	40
75	33	31	27	32	34	42	51	46	41	58	65	65	64	60	51	43	54	61	54
85	37	35	31	37	38	45	55	52	47	62	69	68	68	64	54	47	59	66	59
95	46	42	40	46	48	52	65	63	60	71	76	74	75	71	61	55	68	75	71
100	60	51	53	60	63	65	81	81	81	86	87	83	87	82	72	67	82	87	87
ADM***	31	29	25	28	32	42	51	42	35	59	67	67	64	61	52	41	51	58	46
STOCKTON, CALIF.																			
0	18	20	24	18	31	31	36	31	18	40	42	40	40	44	31	25	25	25	18
50	47	46	50	48	56	61	66	61	54	71	76	75	74	71	64	53	63	68	61
75	54	52	58	56	62	69	74	69	64	80	85	83	83	78	72	61	73	79	73
85	57	55	61	60	66	73	78	74	70	84	89	87	87	82	76	65	77	84	78
95	63	61	70	69	74	82	87	85	82	93	97	94	96	91	85	73	88	95	91
100	72	69	83	83	87	96	102												

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PUBS	DEC	JAN	FEB	1QT	MAR	APR	MAY	2QT	1MF	JUN	JUL	AUG	3QT	SEP	OCT	NOV	4QT	2MF	ANN
VICTORIA, B. C., CAN.																			
0	8	-2	5	-2	17	24	30	17	-2	36	37	37	36	30	22	14	14	14	-2
50	42	40	41	41	45	49	54	49	45	58	61	61	60	57	52	44	51	55	50
75	49	48	49	50	51	56	60	57	56	64	67	67	67	64	59	52	61	64	63
85	51	51	52	53	54	59	64	62	61	68	71	71	70	68	62	55	65	71	68
95	55	54	56	57	60	65	71	70	71	78	80	78	80	76	68	59	74	81	80
100	59	56	60	60	69	75	84	84	84	95	95	91	95	88	77	63	88	95	95
ADM***	45	43	46	45	50	56	61	56	50	65	68	68	67	64	57	49	57	62	56
VISALIA, CALIF.																			
0	20	15	21	13	22	26	29	22	13	35	32	40	32	35	30	24	24	24	13
50	48	47	52	49	56	63	70	63	56	76	82	80	79	75	66	55	66	73	64
75	56	55	60	58	65	73	80	74	68	86	94	90	91	85	76	64	77	85	77
85	60	59	64	63	69	78	85	79	74	90	98	95	95	89	80	68	82	90	83
95	70	68	74	73	77	88	94	91	87	100	106	103	104	98	90	78	93	100	96
100	86	80	89	89	89	104	108	108	108	113	115	115	115	110	104	94	110	115	115
ADM***	59	57	63	60	70	78	86	78	69	93	101	100	98	94	83	70	82	90	79
WACO, TEXAS.																			
0	15	-5	5	-5	15	33	43	15	-5	57	62	64	57	49	32	19	19	19	-5
50	50	47	52	50	58	67	75	67	58	82	85	86	84	79	69	58	69	76	67
75	60	60	63	63	69	75	82	78	73	88	91	91	91	86	78	67	80	89	83
85	64	64	68	68	74	79	85	83	78	91	94	94	94	90	82	72	85	94	89
95	75	73	77	78	83	86	91	90	88	96	99	99	100	96	89	80	94	101	98
100	91	84	90	91	96	95	99	99	99	103	108	108	108	105	98	92	105	108	108
ADM***	60	57	62	60	69	77	85	77	68	92	95	96	94	89	80	69	79	87	78
WASHINGTON, D. C.																			
0	-13	-14	-15	-15	4	15	35	4	-15	43	52	49	43	36	26	11	11	11	-15
50	38	37	38	37	46	55	65	55	46	74	78	76	76	70	58	48	59	67	57
75	50	49	51	50	57	65	73	68	61	82	85	83	84	79	67	58	71	80	73
85	55	54	56	56	62	70	77	73	68	85	88	86	88	83	72	62	76	85	80
95	63	65	68	68	74	80	85	83	80	92	95	94	95	91	81	72	88	95	92
100	74	80	84	84	93														

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• IQT--FIRST QUARTER DEC-JAN-FEB  
• INF--FIRST HALF YEAR DEC---MAY  
•••ADM--AVERAGE DAILY MAXIMUM  
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SURFACE RELIABILITY TEMPERATURE IN DEGREES FAHRENHEIT FOR GIVEN PROBABILITIES OF NOT BEING EXCEEDED

PROM	DEC	JAN	FEB	1QT*	MAR	APR	MAY	2QT	1HF**	JUN	JUL	AUG	3QT	SEP	OCT	NOV	4QT	2HF	ANN
YOUNGSTOWN, OHIO.																			
0	-9	-12	-11	-12	-4	10	28	-4	-12	35	44	43	35	29	21	6	6	6	-12
50	30	28	28	29	37	47	58	47	38	68	72	70	70	65	54	41	53	62	50
75	40	38	38	39	47	57	66	60	51	76	80	77	79	74	62	50	65	75	65
85	44	43	43	44	52	61	70	65	57	80	83	81	83	78	66	54	71	80	71
95	53	54	52	55	63	71	78	76	70	88	90	87	90	87	75	64	82	89	83
100	66	71	65	71	79	86	90	90	90	99	100	97	100	99	87	79	99	100	100
ADN***	37	35	36	36	46	58	70	58	47	79	83	81	81	76	63	48	62	72	59

\*1QT--FIRST QUARTER DEC-JAN-FEB  
 \*\*1HF--FIRST HALF YEAR DEC-MAY  
 \*\*\*ADN--AVERAGE DAILY MAXIMUM

**TABLE 8**

**LIST OF AIRPORTS WITH GEOGRAPHICAL COORDINATES,  
ELEVATION AND LENGTH OF LONGEST RUNWAY**

TABLE 8. LIST OF AIRPORTS

<u>CITY</u>	<u>AIRPORT</u>	<u>CODE</u>	<u>LAT.</u> ° ' N	<u>LONG.</u> ° ' W	<u>ELEV.</u> Ft.	<u>RUNWAY</u> Ft.
Abilene, Texas, USA	Abilene	ABI	32.25	99.41	1778	6,000
Akron, Ohio, USA	Akron-Canton	CAK	40.55	81.27	1228	5,600
Alamogordo, N. Mex., USA	Holloman AFB	ALM	32.51	106.06	4094	12,100
Albany, Ga., USA	Albany	ABY	31.32	84.12	196	5,000
Albany, N. Y., USA	Albany Muni.	ALB	42.45	73.48	288	5,000
Albuquerque, N. Mex., USA	Kirtland AFB	ABQ	35.03	106.36	5352	12,800
Alexandria, La., USA	England AFB	AEX	31.20	92.33	89	9,300
Allentown, Pa., USA	Allentown-Bethlehem-Easton	ABE	40.39	75.26	391	6,100
Amarillo, Texas, USA	Amarillo AFB/Muni	AMA	35.14	101.42	3607	13,500
Anchorage, Alaska, USA	Anchorage Int'l	ANC	61.11	150.00	124	10,600
Anderson, S. C., USA	Anderson Muni	AND	34.30	82.43	782	5,000
Annette Island, Alaska, USA	Annette	ANN	55.02	131.34	119	7,500
Asheville, N. C., USA	Asheville-Hendersonville	AVL	35.26	82.32	2161	6,500
Atlanta, Ga., USA	Atlanta Muni.	ATL	33.39	84.26	1024	7,800
Atlantic City, N. J., USA	Atlantic City NAFC	NBB	39.27	74.35	76	10,000
Augusta, Ga., USA	Bush Field	AGS	33.22	81.58	142	5,300
Augusta, Me., USA	Augusta State	AUG	44.19	69.47	357	4,200
Austin, Texas, USA	Mueller Muni.	AUS	30.18	97.42	632	6,400
Bakersfield, Calif., USA	Meadows Field	BFL	35.26	119.03	514	5,700
Baltimore, Md., USA	Friendship Int'l	BAL	39.10	76.40	146	9,400
Bangor, Me., USA	Dow AFB	BGR	44.48	68.49	202	11,400
Baton Rouge, La., USA	Ryan	BTR	30.32	91.09	70	6,000
Beaumont, Texas, USA	Jefferson Co.	BUJ	29.57	94.01	15	5,700
Big Mountain, Alaska, USA		BMX	59.22	155.15	663	4,200
Big Spring, Texas, USA	Webb AFB	BGS	32.13	101.31	2561	8,800
Billings, Mont., USA	Logan Field	BIL	45.48	108.32	3606	8,600
Binghamton, N. Y., USA	Broome Co.	BGM	42.13	75.59	1629	5,600
Birmingham, Ala., USA	Birmingham Muni.	BGM	33.34	86.45	643	10,000
Bisbee, Ariz., USA	Bisbee-Douglas Int'l	DUG	31.28	109.36	4158	7,500
Bismark, N. Dak., USA	Bismark Muni.	BIS	46.47	100.45	1653	5,200
Boise, Idaho, USA	Boise Air Terminal	BOI	43.34	116.13	2858	9,000
Boston, Mass., USA	Logan Int'l	BOS	42.22	71.00	19	10,000
Bowling Green, Ky., USA	Warren Co. Muni.	BWG	36.58	86.26	539	5,200
Bozeman, Mont., USA	Gallatin Field	BZN	45.47	111.10	4461	5,200
Bristol, Tenn., USA	Tri-City Muni.	TRI	36.29	82.24	1519	6,600
Brownsville, Texas, USA	Harlingen AFB	HRL	26.13	97.39	35	6,000
Brunswick, Ga., USA	McKinnon	SSI	31.09	81.23	20	4,300
Buffalo, N. Y., USA	Greater Buffalo Int'l	BUF	42.56	78.44	711	5,600
Burbank, Calif., USA	Lockheed Air Terminal	BUR	34.12	118.22	775	6,500
Burlington, Vt., USA	Burlington Muni.	BTB	44.28	73.09	335	7,800
Butte, Mont., USA	Silver Bow Co. Apt.	BTM	45.57	112.30	5554	6,800
Calgary, Alb., CANADA	Calgary	YYC	51.06	114.01	3557	8,700
Carlsbad, N. Mex., USA	Carlsbad Muni.	CNM	32.30	104.16	3276	6,600
Casper, Wyo., USA	Casper Air Terminal	CPR	42.55	106.28	5348	10,600
Castlegar, B. C., CANADA		YCG	49.18	117.38	1620	4,800

<u>CITY</u>	<u>AIRPORT</u>	<u>CODE</u>	<u>LAT.</u> ° N	<u>LONG.</u> ° W	<u>ELEV.</u> Ft.	<u>RUNWAY</u> Ft.
Cedar Rapids, Iowa, USA	Cedar Rapids Muni.	CID	41.53	91.42	863	5,400
Charleston, S. C., USA	Charleston AFB/Muni.	CHS	32.54	80.02	45	9,000
Charleston, W. Va., USA	Kanawha Co.	CHW	38.22	81.36	982	5,600
Charlotte, N. C., USA	Douglas Muni.	CLT	35.13	80.56	748	7,500
Chattanooga, Tenn., USA	Lovell Field	CHA	35.02	85.12	682	6,200
Cheyenne, Wyo., USA	Cheyenne Muni.	CYS	41.09	104.49	6156	9,300
Chicago, Ill., USA	O'Hare Chicago Int'l	ORD	41.59	87.54	667	11,600
Cincinnati, Ohio, USA	Greater Cincinnati	CUG	39.03	84.40	890	8,600
Cleveland, Ohio, USA	Cleveland-Hopkins	CLE	41.25	81.51	789	9,000
College Station, Texas, USA	Easterwood Field	CLL	30.35	96.22	319	5,200
Colorado Springs, Colo., USA	Peterson Field	COS	38.49	104.43	6172	9,100
Columbia, S. C., USA	Columbia	CAE	33.57	81.07	244	5,200
Columbus, Ga., USA	Muscogee Co.	CSG	32.31	84.57	397	5,000
Columbus, Ohio, USA	Port Columbus	CMH	40.00	82.53	816	10,700
Comox, B. C., CANADA		YQQ	49.43	124.54	83	8,000
Concord, N. H., USA	Concord Muni.	CON	43.12	71.31	345	5,000
Corpus Christi, Texas, USA	Corpus Christi Int'l	CRP	27.46	97.30	44	5,600
Cranbrook, B. C., CANADA		YXC	49.32	115.46	2997	4,900
Dallas, Texas, USA	Love Field	DAL	32.51	96.51	485	7,700
Dawson City, Y. T., CANADA		YQD	64.03	139.05	1211	4,000
Dayton, Ohio, USA	Dayton Muni.	DAY	39.54	84.13	1008	7,000
Daytona Beach, Fla., USA	Daytona Beach Muni.	DAB	29.11	81.03	34	5,700
Denver, Colo., USA	Stapleton Airfield	DEN	39.46	104.53	5331	10,000
Des Moines, Iowa, USA	Des Moines	DSM	41.32	93.39	957	7,500
Detroit, Mich., USA	Detroit Metropolitan Wayne Co.	YIP	42.14	83.21	639	10,500
Dothan, Ala., USA	Dothan	DHN	31.14	85.27	330	4,000
Easton, Pa., USA	Easton	ABE	40.44	75.15	380	2,200
Edmonton, Alb., CANADA	Edmonton Int'l	YXD	53.19	113.35	2373	11,000
Elko, Nev., USA	Elko	EKO	40.50	115.48	5135	6,400
Elmira, N. Y., USA	Chemung Co.	ELM	42.09	76.54	951	4,700
El Paso, Texas, USA	El Paso Int'l	ELP	31.48	106.23	3939	11,000
Ely, Nev., USA	Ely	ELY	39.18	114.51	6258	6,000
Eugene, Ore., USA	Mahlon-Sweet Field	EUG	44.08	123.13	365	5,500
Evansville, Ind., USA	Dress Memorial	EVV	38.03	87.32	389	6,000
Fairbanks, Alas., USA	Fairbanks Int'l	FAI	64.49	147.51	434	10,300
Fargo, N. Dak., USA	Hector Field	FAR	46.55	96.49	900	7,100
Fayetteville, Ark., USA	Fayetteville-Drake Field	FYV	36.00	94.10	1250	5,000
Fitchburg, Mass., USA	Fitchburg Muni.	FIT	42.33	71.45	350	4,500
Flint, Mich., USA	Bishop	FNT	42.58	83.45	781	5,000
Florence, S. C., USA	Florence Muni.	FLO	34.11	79.43	146	6,000
Ft. Lauderdale, Fla., USA	Broward Co. Int'l	FLL	26.04	80.10	10	6,500
Ft. Meyers, Fla., USA	Page Field	FMY	26.35	81.52	17	5,000
Ft. Nelson, B. C., CANADA		YYE	58.50	122.35	1253	6,400
Ft. St. John, B. C., CANADA		YXJ	56.14	120.44	2280	6,700
Ft. Smith, Ark., USA	Ft. Smith Muni.	FSM	35.20	94.22	468	8,000

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Ft. Wayne, Ind., USA	Baer Field	FWA	40.59	85.12	801	7,000
Ft. William, Ont., CANADA	Lakehead	YQT	48.20	89.23	653	6,200
Ft. Worth, Texas, USA	Amon Carter Field	ACF	32.50	97.03	568	8,400
Fredericton, N. Brunswick, CANADA		YFC	45.52	66.32	67	6,000
Fresno, Calif., USA	Fresno Air Terminal	FAT	36.46	119.43	331	7,100
Gainesville, Fla., USA	Gainesville	GNV	29.42	82.16	155	5,000
Gander, Nfld., CANADA	Gander Int'l	YQX	48.57	53.34	496	8,600
Glens Falls, N. Y., USA	Warren Co.	GFL	43.21	73.37	328	5,000
Goose Bay, Lab., Nfld, CAN.	Goose	YYR	53.19	60.25	150	11,000
Grand Forks, N. Dak., USA	Grand Forks Int'l	GFK	47.56	97.06	836	4,900
Grand Junction, Colo., USA	Walker Field	GJT	39.06	108.32	4858	5,400
Grand Prairie, Alb., CANADA		YQU	55.11	118.53	2193	6,500
Grand Rapids, Mich., USA	Kent Co.	GRR	42.54	85.40	692	5,700
Great Falls, Mont., USA	Great Falls Int'l	GTF	47.29	111.22	3671	9,000
Greensboro, N. C., USA	Greensboro-High Point	GSO	36.06	79.57	922	5,500
Greenville, S. C., USA	Greenville Muni.	GRL	34.51	82.21	1047	5,400
Halifax, N. S., CANADA	Halifax Int'l	YXF	44.53	63.31	476	8,800
Harrisburg, Pa., USA	Harrisburg-York State	HAR	40.13	76.51	347	5,000
Hartford, Conn., USA	Brainard	BDL	41.44	72.39	18	3,400
Helena, Mont., USA	Helena	HLN	46.36	111.59	3881	5,100
Hobbs, N. Mex., USA	Hobbs Muni.	HOB	32.46	103.13	3707	8,800
Homer, Alaska, USA	Homer Muni.	HOM	59.38	151.29	96	5,000
Honolulu, Hawaii, USA	Honolulu Int'l	HNL	21.10	157.51	13	12,380
Hot Springs, Ark., USA	Memorial Field	HOT	34.29	93.06	535	5,000
Houlton, Me., USA	Houlton Int'l	HUL	46.07	67.48	493	5,000
Houston, Texas, USA	Houston Int'l	HOU	29.39	95.16	50	7,600
Huntington, W. Va., USA	Tri-State,	HTS	38.22	82.33	828	5,300
Huntsville, Ala., USA	Huntsville Muni.	HSV	34.41	86.35	619	5,200
Huron, S. Dak., USA	Howes Muni.	HON	44.23	98.14	1287	5,100
Hyannis, Mass., USA	Barnstable Muni.	HYA	41.40	70.17	52	5,000
Idaho Falls, Idaho, USA	Fanning Field	IDA	43.31	112.04	4738	6,600
Indianapolis, Ind., USA	Weir Cook	IND	39.44	86.17	797	7,300
Jackson, Miss., USA	Hawkins Field	JAN	32.20	90.14	343	5,400
Jacksonville, Fla., USA	Imeson Field	JAX	30.25	81.38	52	7,000
Jamestown, N. Dak., USA	Jamestown Muni.	JMS	46.56	98.41	1498	5,700
Joplin, Mo., USA	Joplin	JLN	37.09	94.30	980	5,500
Juneau, Alaska, USA	Juneau Muni.	JNU	58.21	134.35	26	6,400
Kansas City, Mo., USA	Kansas City Muni	MKC	39.07	94.36	758	7,000
Keene, N. H., USA	Dillant-Hopkins	EEN	42.54	72.16	482	4,500
Key West, Fla., USA	Key West Int'l	EYW	24.34	81.46	4	4,800
King Salmon, Alaska, USA		AKN	58.41	156.39	55	7,500
Knoxville, Tenn., USA	McGhee-Tyson	TYS	35.49	83.59	989	7,500
Kodiak, Alaska, USA	Kodiak NAS	NBH	57.45	152.29	77	7,500

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Laconia, N. H., USA	Laconia Muni.	LCI	43.34	71.26	552	3,500
Lafayette, La., USA	Lafayette Muni.	LFT	30.13	92.00	41	5,000
Lake Charles, La., USA	Chennault AFB/Muni.	LKC	30.13	93.10	19	11,400
Lakeland, Fla., USA	Drane Field	LAL	28.00	82.01	142	5,000
Lancaster, Pa., USA	Lancaster	LNS	40.07	76.18	403	5,000
Land O'Lakes, Wisc., USA	Kings Gateway	LNL	46.09	89.12	1706	4,400
Lansing, Mich., USA	Capital City	LAN	42.47	84.35	859	5,000
Las Vegas, Nev., USA	McCarran Field	LAS	36.05	115.10	2171	10,000
Lawrence, Mass., USA	Lawrence	LWM	42.43	71.08	165	5,000
Lawton, Okla., USA	Lawton Muni.	LAW	34.34	98.24	1108	5,400
Lebanon, N. H., USA	Lebanon Regional	LEB	43.38	72.18	580	5,500
Lethbridge, Alberta, CANADA		YLQ	49.38	112.48	3047	6,500
Lewiston, Me., USA	College Road	LEW	44.07	70.11	210	
Lexington, Ky., USA	Blue Grass Field	LEX	38.02	84.36	978	5,500
Lincoln, Neb., USA	Lincoln AFB	LNK	40.51	96.46	1195	12,900
Little Rock, Ark., USA	Adams Field	LIT	34.44	92.14	257	7,000
Long Beach, Calif., USA	Long Beach	LGB	33.49	118.09	56	10,000
Los Angeles, Calif., USA	Los Angeles Int'l	LAX	33.56	118.24	126	12,000
Louisville, Ky., USA	Standiford	SDF	38.11	85.44	497	7,800
Lubbock, Texas, USA	Lubbock Muni.	LBB	33.40	101.49	3256	8,500
Macon, Ga., USA	Macon Muni.	MCN	32.41	83.39	354	5,000
Madison, Wisc., USA	Madison Muni.	MSN	43.09	89.20	859	7,600
Manchester, N. H., USA	Hooksett-Manchester	MHT	43.04	71.28	187	7,000
Martha's Vineyard, Vineyard Haven, Mass., USA	Martha's Vineyard	MVY	41.24	70.37	68	5,000
Massena, N. Y., USA	Richards Field	MSS	44.56	74.51	215	5,000
Mayo, Y. T., CANADA		YMA	63.37	135.52	1625	3,200
McAlester, Okla., USA	McAlester Muni.	MLC	34.53	95.47	770	4,000
Medford, Ore., USA	Medford Muni.	MFR	42.23	122.53	1330	5,400
Melbourne, Fla., USA	Melbourne-Eau Gallie	MLB	28.06	80.38	26	5,200
Memphis, Tenn., USA	Memphis Muni.	MEM	35.04	89.59	291	8,900
Merced, Calif., USA	Merced Muni.	MCE	37.17	120.31	155	4,700
Meridian, Miss., USA	Key Field	MEI	33.21	88.45	297	8,000
Miami, Fla., USA	Miami Int'l	MIA	25.48	80.17	9	10,500
Midland, Texas, USA	Midland Air Terminal	MAF	31.57	102.12	2867	6,600
Milwaukee, Wisc., USA	Gen. Mitchell Field	MKE	42.57	87.54	702	9,900
Minneapolis/St. Paul, Minn., USA	Minneapolis/St. Paul Int'l	MSP	44.53	93.13	840	8,200
Missoula, Mont., USA	Missoula Co.	MSO	46.55	114.05	3203	7,000
Mobile, Ala., USA	Bates Field	MOB	30.41	88.14	217	6,000
Modesto, Calif., USA	Modesto-City-County	MOD	37.38	120.57	96	5,000
Moline, Ill., USA	Quad-City	MLI	41.27	90.31	590	5,500
Moncton, New Bruns., CANADA		YQM	46.07	64.41	232	6,200
Monroe, La., USA	Selman Field	MLU	32.30	92.02	79	5,000
Monterey, Calif., USA	Monterey Peninsula	MRY	36.35	121.51	220	5,000
Montgomery, Ala., USA	Dannelly Field	MGM	32.18	86.24	221	8,000
Montpelier, Vt., USA	Barre-Montpelier Muni.	MPV	44.12	72.34	1157	4,500
Montreal, Que., CANADA	Montreal Int'l	YUL	45.28	73.45	117	9,600

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Muscle Shoals, Ala., USA	Muscle Shoals	MSL	34.45	87.37	548	4,900
Muskegon, Mich., USA	Muskegon Co.	MKG	43.11	86.14	628	5,000
Nantucket, Mass., USA	Nantucket Memorial	ACK	41.16	70.04	48	5,000
Nashville, Tenn., USA	Nashville-Berry-Field	BNA	36.08	86.41	597	8,000
New Bedford, Mass., USA	New Bedford Muni.	EWB	41.40	70.58	79	5,000
New Bern, N. C., USA	Simmons-Nott	EWN	35.04	77.03	18	4,800
New Haven, Conn., USA	New Haven Muni.	NHV	41.16	72.53	15	4,700
New Orleans, La., USA	Moisant Int'l	MSV	20.00	90.15	3	8,500
Newport News, Va., USA	Patrick Henry	PHF	37.08	76.30	41	5,600
New York, N. Y., USA	N.Y. Int'l (Idlewild)	IDL	40.38	73.47	12	14,600
Norfolk, Va., USA	Norfolk Muni.	ORF	36.54	76.12	26	5,000
North Bay, Ont., CANADA		YYB	46.22	79.25	1215	8,200
Oakland, Calif., USA	Oakland	OAK	37.44	122.13	5	6,200
Ocala, Fla., USA	Taylor Field	OCF	29.11	82.09	84	4,000
Oklahoma City, Okla., USA	Will Rogers	OKC	35.24	97.37	1284	9,800
Omaha, Nebr., USA	Lincoln AFB	OMH	40.51	96.46	1195	12,900
Ontario, Calif., USA	Ontario Int'l	ONT	34.03	117.37	952	8,200
Orlando, Fla., USA	Orlando Muni-Herndon	ORL	28.33	81.20	113	6,000
Ottawa, Ont., CANADA		YOW	45.19	75.40	374	8,800
Owensboro, Ky., USA	Owensboro-Davless Co.	OWB	37.45	87.10	407	5,000
Paducah, Ky., USA	Barkley Field	PUK	37.04	88.46	407	5,000
Palm Springs, Calif., USA	Palm Springs	PSP	33.50	116.30	448	7,000
Panama City, Fla., USA	Fannin	PFN	30.13	85.41	14	4,900
Pendleton, Ore., USA	Pendleton Field	PDT	45.41	118.50	1493	6,300
Pensacola, Fla., USA	Pensacola Muni.	PNS	30.28	87.12	121	5,000
Penticton, B. C., CANADA		YYF	49.28	119.36	1129	6,000
Philadelphia, Pa., USA	Philadelphia Int'l	PHL	39.53	75.14	14	9,500
Phoenix, Ariz., USA	Phoenix-Sky Harbor Muni.	PHX	33.26	112.01	1122	8,800
Pierre, S. Dak., USA	Pierre Muni.	PIR	44.23	100.17	1742	7,200
Pittsburgh, Pa., USA	Greater Pittsburgh	PIT	40.29	80.13	1168	7,500
Pittsfield, Mass., USA	Pittsfield Muni.	PSF	42.26	73.18	1170	3,500
Pocatello, Ida., USA	Pocatello Muni.	PIH	42.55	112.36	4448	8,300
Port Hardy, B. C., CANADA		YZT	50.41	127.22	80	5,000
Portland, Me., USA	Portland Muni.	PWM	43.39	70.19	66	5,000
Portland, Ore., USA	Portland Int'l	PDX	45.35	122.36	23	8,800
Presque Isle, Me., USA	Presque Isle Muni.	PQI	46.41	68.03	534	7,400
Prince George, B. C., CAN.		YXS	53.53	122.41	2268	5,700
Prince Rupert, B. C., CAN.		YPR	54.17	130.27	111	6,000
Providence, R. I., USA	Green	PVD	41.44	71.26	56	5,400
Pueblo, Colo., USA	Pueblo Memorial	PUB	38.18	104.30	4725	8,800
Quebec, Que., CANADA		YQB	46.48	71.23	239	6,000
Quesnel, B. C., CANADA		YQZ	53.05	122.31	1789	5,500
Raleigh, N. C., USA	Raleigh-Durham	RDU	35.52	78.47	435	5,500
Rapid City, S. Dak., USA	Rapid City Muni.	RAP	44.03	103.03	3181	6,200

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Reading, Pa., USA	Gen. Spaatz Field	RDG	40.23	75.58	343	5,100
Regina, Sask., CANADA		YQR	50.26	104.40	1893	6,900
Reno, Nev., USA	Reno Muni.	RNO	39.30	119.46	4411	7,800
Richmond, Va., USA	Byrd Field	RIC	37.30	77.19	167	8,000
Roanoke, Va., USA	Roanoke Muni.	ROA	37.19	79.58	1174	5,400
Rochester, Minn., USA	Rochester Muni. Aprt.	RST	43.55	92.30	1310	6,400
Rochester, N. Y., USA	Rochester-Monroe	ROC	43.07	77.40	560	5,000
Rockland, Me., USA	Rockland Muni.	RKD	44.04	69.06	60	4,500
Rome, Ga., USA	Russell Field	RMG	34.21	85.10	644	4,500
Roswell, N. Mex., USA	Roswell Muni.	ROW	33.25	104.33	3623	5,600
Rouyn-Noranda, Que., CANADA		YUY	48.13	79.05	987	5,600
Sacramento, Calif., USA	Sacramento	SAC	38.31	121.19	21	
Saginaw, Mich., USA	Tri-City	MBS	43.32	84.05	667	5,600
Saguenay, Que., CANADA		YBG	48.30	71.00		
St. John, N. B., CANADA	St. John Muni.	YSJ	45.19	65.53	356	5,500
St. Johns, Nfld., CANADA	Torbay	YYT	47.47	52.45	484	7,000
St. Louis, Mo., USA	Lambert-St. Louis Muni.	STL	38.45	90.22	571	10,000
St. Petersburg, Fla., USA	St. Petersburg- Clearwater Int'l	PIE	27.55	82.42	10	8,000
Salem, Ore., USA	Salem-McNary Field	SLE	44.55	123.00	207	5,500
Salinas, Calif., USA	Salinas Muni.	SNS	36.40	121.36	84	5,000
Salt Lake City, Utah, USA	Salt Lake City Muni.	SLC	40.47	111.58	4226	10,000
San Angelo, Texas, USA	Mathis Field	SJT	31.22	100.30	1915	5,900
San Antonio, Texas, USA	San Antonio Int'l	SAT	29.32	98.28	800	8,500
San Diego, Calif., USA	Lindbergh Field	SAN	32.44	117.11	15	8,100
Sandspit, B. C., CANADA		YZP	53.15	131.49	16	5,100
San Francisco/Oakland, Calif., USA	San Francisco Int'l	SFO	37.38	122.23	10	9,500
Santa Barbara, Calif., USA	Santa Barbara Muni.	SBA	34.26	119.50	14	4,700
Santa Fe, N. Mex., USA	Santa Fe Co. Muni.	SAF	35.37	106.05	6344	8,300
Sarasota, Fla., USA	Sarasota-Branden	SRQ	27.24	82.33	24	5,000
Saskatoon, Sask., CANADA		YXE	52.10	106.41	1653	8,300
Sault Ste. Marie, Ont., CAN.			46.29	84.30	631	6,000
Savannah, Ga., USA	Hunter Field (Muni.)	SAV	32.01	81.08	40	11,400
Scranton, Pa., USA	Scranton	AVP	41.29	75.46	1179	2,400
Seattle, Wash., USA	Seattle-Tacoma Int'l	SEA	47.27	122.19	428	9,800
Seven Islands, Que., CAN.		YZV	50.13	66.16	180	6,600
Sharon, Pa., USA	Sharon	YNG	41.13	80.27	1140	2,400
Sheridan, Wyo., USA	Sheridan Co.	SHR	44.47	106.58	4021	6,000
Shreveport, La., USA	Greater Shreveport	SHV	32.27	93.49	251	6,400
Sioux City, Iowa, USA	Sioux City Muni.	SUX	42.24	96.23	1097	9,000
Sioux Falls, S. Dak., USA	Foss Field	FSD	43.35	96.45	1426	7,100
Smithers, B. C., CANADA		YZV	54.49	127.11	1719	5,000
South Bend, Ind., USA	St. Joseph Co.	SBN	41.42	86.19	778	5,000
Spartanburg, S. C., USA	Spartanburg Muni.	SPA	34.55	81.58	816	5,000
Spokane, Wash., USA	Spokane Int'l	GEG	47.38	117.38	2462	13,900
Springfield, Ill., USA	Capital	SPI	39.15	89.40	593	7,000
Springfield, Mo., USA	Springfield Muni.	SGV	37.15	93.23	1267	5,600

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Stephenville, Nfld., CAN.	Ernst Harmon AFB	YJT	48.32	58.33	86	10,000
Stockton, Calif., USA	Stockton Muni.	SCK	37.54	121.15	27	8,600
Sudbury, Ont., CANADA		YSB	46.37	80.48	1120	6,600
Swift Current, Sask., CANADA		YYN	50.17	107.41	2680	4,200
Sydney, N. S., CANADA		YQY	46.10	60.03	202	6,000
Syracuse, N. Y., USA	Hancock	SYR	43.07	76.07	421	8,000
Tallahassee, Fla., USA	Tallahassee Muni.	TLH	30.24	84.21	82	6,100
Tampa, Fla., USA	Tampa Int'l	TPA	27.58	82.32	27	8,300
Temple, Texas, USA	Draughon-Miller Muni.	TPL	31.09	97.25	698	5,000
Terrace, B. C., CANADA		YXT	54.28	128.35	713	5,200
Terre Haute, Ind., USA	Hulman Field	HUF	39.27	87.19	585	8,000
Texarkana, Ark., USA	Texarkana Muni	TXK	33.27	94.00	389	5,200
Timmins, Ont., USA		YTS	48.34	81.22	967	5,700
Toledo, Ohio, USA	Toledo Express	TOL	41.35	83.48	684	7,000
Toronto, Ont., CANADA	Toronto Int'l (Malton)	YYZ	43.41	79.38	567	11,000
Tucson, Ariz., USA	Tucson Muni.	TUS	32.07	110.57	2630	12,000
Tulsa, Okla., USA	Tulsa Muni.	TUL	36.12	95.53	674	10,000
Val D'Or, Que., CANADA		YVO	48.03	77.47	1109	8,200
Vancouver, B. C., CANADA	Sea Island	YVR	49.11	123.10	9	8,600
Vero Beach, Fla., USA	Vero Beach Muni.	VRB	27.39	80.25	24	7,200
Victoria, B. C., CANADA	Victoria Int'l	YYJ	48.39	123.26	63	5,000
Visalia, Calif., USA	Visalia Muni.	VIS	36.19	119.24	292	5,300
Waco, Texas, USA	Waco Muni.	ACT	31.37	97.14	515	5,700
Washington, D. C., USA	Washington Nat'l	DCA	38.51	77.02	15	6,900
Waterloo, Iowa, USA	Waterloo Muni.	ALO	42.34	92.24	870	5,400
Waterville, Maine, USA	Waterville Muni.	WVL	44.32	69.40	332	4,000
Watson Lake, Y. T., CANADA		YQH	60.07	128.49	2255	5,500
Waycross, Ga., USA	Waycross-Ware Co.	AYS	31.15	82.24	142	5,000
West Palm Beach, Fla., USA	Palm Beach Int'l	PBI	26.41	80.06	19	8,000
Whitehorse, Y. T., CANADA		YXE	60.43	135.04	2303	7,200
Wichita, Kan., USA	Wichita	ICT	37.39	97.26	1332	7,300
Wichita Falls, Texas, USA	Wichita Falls	SPS	33.59	98.30	1015	13,100
Williams Lake, B. C., CAN.		YWL	52.11	122.03	3085	7,000
Williamsport, Pa., USA	Williamsport- Lycoming Co.	IPT	41.14	76.55	528	5,000
Wilmington, Del., USA	Greater Wilmington	ILG	39.41	75.36	79	7,100
Wilmington, N. C., USA	New Hanover Co.	IMN	34.16	77.54	31	8,000
Windsor, Ont., CANADA		YQG	46.16	82.58	622	6,200
Winnipeg, Man., CANADA	Winnipeg Int'l	YWG	49.54	97.14	785	8,700
Worcester, Mass., USA	Worcester Muni.	ORH	42.16	71.52	1009	5,500
Yakima, Wash., USA	Yakima Muni.	YKM	46.34	120.32	1082	5,500
Yarmouth, N. S., CANADA		YQI	43.50	66.05	157	5,800
Yorkton, Sask., CANADA		YQV	51.16	102.28	1635	4,800
Youngstown, Ohio, USA	Youngstown Muni.	YNG	41.16	80.41	1196	7,500

**TABLE 9**

**ROUTES INDEXED ALPHABETICALLY  
AND UNDER BOTH TERMINALS**

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Dallas - - - - -	23,105	Colorado Springs - - -	26,107	Raleigh - - - - -	29,109	Boston - - - - -	32,111
El Paso - - - - -	23,105	Dallas - - - - -	26,107	Rome - - - - -	29,109	Houlton - - - - -	32,111
Ft. Worth - - - - -	23,105	Denver - - - - -	26,107	St. Louis - - - - -	88	Portland, Me. - - - -	32,111
Houston - - - - -	23,105	Lubbock - - - - -	26,107	St. Petersburg - - - -	29,109	Presque Isle - - - - -	32,111
Lubbock - - - - -	23,105	Oklahoma City - - - -	26,107	San Antonio - - - - -	88		
Midland - - - - -	23,105	Wichita - - - - -	27,107	San Francisco - - - - -	88		
				Savannah - - - - -	29,109	<b>BATON ROUGE</b>	
<b>AKRON</b>		<b>ANCHORAGE</b>		Shreveport - - - - -	88	Lafayette - - - - -	32,111
Charleston, W. Va. - -	23,105	Chicago - - - - -	85	Tallahassee - - - - -	29,109	Lake Charles - - - - -	32,112
Chicago - - - - -	23,105	Edmonton - - - - -	85	Tampa - - - - -	29,109	New Orleans - - - - -	32,112
Cincinnati - - - - -	23,105	Fairbanks - - - - -	85	Washington, D. C. - - -	88		
Cleveland - - - - -	23,105	Juneau - - - - -	85	<b>ATLANTIC CITY</b>		<b>BEAUMONT</b>	
Columbus, Ohio - - - -	23,105	King Salmon - - - - -	85	New York - - - - -	29,109	Houston - - - - -	32,112
Dayton - - - - -	23,105	Los Angeles - - - - -	85	Washington, D. C. - - -	29,109	Lake Charles - - - - -	32,112
Detroit - - - - -	23,105	Minneapolis - - - - -	85			Shreveport - - - - -	32,112
New York - - - - -	24,105	New York - - - - -	85	<b>AUGUSTA, GA.</b>		<b>BERHADA</b>	
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Toledo - - - - -	24,105			Charleston, S. C. - - -	29,110		
Washington, D.C. - - -	24,105	<b>ANDERSON</b>		Columbia - - - - -	29,110	<b>BIG SPRING</b>	
Youngstown - - - - -	24,105	Atlanta - - - - -	27,108	Jacksonville - - - - -	29,110	Abilene - - - - -	23,105
		Greenville - - - - -	27,108	Savannah - - - - -	30,110	Midland - - - - -	32,112
<b>ALAMOGORDO</b>		<b>ANNETTE ISLAND</b>				<b>BILLINGS</b>	
Albuquerque - - - - -	24,106	Juneau - - - - -	85	<b>AUGUSTA, ME.</b>		Bismark - - - - -	32,112
El Paso - - - - -	24,106	Seattle - - - - -	85	Bangor - - - - -	30,110	Bozeman - - - - -	33,112
				Lewiston - - - - -	30,110	Casper - - - - -	33,112
<b>ALBANY, GA.</b>		<b>ASHEVILLE</b>		Rockland - - - - -	30,110	Great Falls - - - - -	33,112
Atlanta, Ga. - - - - -	24,106	Atlanta - - - - -	27,108	<b>AUSTIN</b>		Sheridan - - - - -	33,112
Macon - - - - -	24,106	Bristol - - - - -	27,108	Dallas - - - - -	30,110		
Tallahassee - - - - -	24,106	Charlotte - - - - -	27,108	Ft. Worth - - - - -	30,110	<b>BINGHAMPTON</b>	
Tampa - - - - -	24,106	Greensboro - - - - -	27,108	Houston - - - - -	30,110	Albany, N. Y. - - - -	24,106
		Knoxville - - - - -	27,108	San Angelo - - - - -	30,110	Pittsburgh - - - - -	33,112
<b>ALBANY, N. Y.</b>				San Antonio - - - - -	30,110	Scranton - - - - -	33,112
Binghampton - - - - -	24,106	<b>ATLANTA</b>		Waco - - - - -	30,110	Syracuse - - - - -	33,112
Boston - - - - -	24,106	Albany, Ga. - - - - -	24,108				
Buffalo - - - - -	24,106	Anderson - - - - -	27,108	<b>BAKERSFIELD</b>		<b>BIRMINGHAM</b>	
Glens Falls - - - - -	25,106	Asheville - - - - -	27,108	Fresno - - - - -	30,110	Atlanta - - - - -	27,108
Hartford - - - - -	25,106	Augusta, Ga. - - - - -	27	Los Angeles - - - - -	30,110	Charlotte - - - - -	33,112
New York - - - - -	25,106	Baltimore - - - - -	85	Visalia - - - - -	30,110	Chattanooga - - - - -	33,112
Rochester, N. Y. - - -	25,106	Birmingham - - - - -	27,108			Chicago - - - - -	90
Syracuse - - - - -	25,106	Charleston, S. C. - - -	27,108	<b>BALTIMORE</b>		Greensboro - - - - -	33,112
		Charleston, W. Va. - - -	27,108	Atlanta - - - - -	85	Huntsville - - - - -	33,112
<b>ALBUQUERQUE</b>		Charlotte - - - - -	27,108	Boston - - - - -	30,110	Jackson - - - - -	33,112
Alamogordo - - - - -	24,106	Chattanooga - - - - -	27,108	Buffalo - - - - -	31,110	Knoxville - - - - -	33,113
Amarillo - - - - -	25,106	Chicago - - - - -	86	Charlotte - - - - -	31,110	Memphis - - - - -	33,113
Chicago - - - - -	83	Cincinnati - - - - -	28,108	Chicago - - - - -	88	Meridian - - - - -	34,113
Dallas - - - - -	83	Cleveland - - - - -	86	Dallas - - - - -	88	Mobile - - - - -	34,113
Denver - - - - -	25,106	Columbia - - - - -	28,108	Denver - - - - -	89	Montgomery - - - - -	34,113
El Paso - - - - -	25,106	Columbus, Ga. - - - - -	28,108	Detroit - - - - -	31,111	Muscle Shoals - - - - -	34,113
Las Vegas - - - - -	83	Dallas - - - - -	86	Harrisburg - - - - -	31,111	New Orleans - - - - -	34,113
Los Angeles - - - - -	84	Detroit - - - - -	86	Houston - - - - -	89	New York - - - - -	90
Lubbock - - - - -	25,106	Greensboro - - - - -	28,108	Kansas City - - - - -	89	Pensacola - - - - -	34,113
Phoenix - - - - -	25,106	Greenville - - - - -	28,108	Lancaster - - - - -	31,111	Pittsburgh - - - - -	90
Roswell - - - - -	25,107	Houston - - - - -	86	Los Angeles - - - - -	89	Washington, D. C. - - -	90
San Francisco - - - - -	84	Indianapolis - - - - -	28,108	Miami - - - - -	89		
Santa Fe - - - - -	25,107	Jacksonville - - - - -	28,109	Montreal - - - - -	31,111	<b>BISBEE</b>	
Wichita - - - - -	84	Knoxville - - - - -	28,109	New York - - - - -	31,111	El Paso - - - - -	34,113
		Los Angeles - - - - -	86	Norfolk - - - - -	31,111	Tucson - - - - -	34,113
<b>ALEXANDRIA</b>		Louisville - - - - -	28,109	Philadelphia - - - - -	31,111		
Baton Rouge - - - - -	25,107	Macon - - - - -	28,109	Phoenix - - - - -	89	<b>BISMARCK</b>	
Shreveport - - - - -	25,107	Melbourne - - - - -	28,109	Pittsburgh - - - - -	31,111	Billings - - - - -	32,112
		Memphis - - - - -	28,109	Providence - - - - -	31,111	Fargo - - - - -	34,113
<b>ALLETOWN</b>		Miami - - - - -	87	Richmond - - - - -	31,111	Jamestown - - - - -	34,113
Cleveland - - - - -	26,107	Mobile - - - - -	28,109	Rochester, N. Y. - - -	31,111	Minneapolis - - - - -	34,113
Harrisburg - - - - -	26,107	Montgomery - - - - -	28,109	St. Louis - - - - -	89		
New York - - - - -	26,107	Nashville - - - - -	29,109	San Francisco - - - - -	89	<b>BOISE</b>	
Philadelphia - - - - -	26,107	New Orleans - - - - -	29,109	Syracuse - - - - -	31,111	Denver - - - - -	91
Pittsburgh - - - - -	26,107	New York - - - - -	87	Tampa - - - - -	90	Pendleton - - - - -	34,113
Reading - - - - -	26,107	Norfolk - - - - -	87	Washington, D. C. - - -	32,111	Portland, Ore. - - - -	34,113
Scranton - - - - -	26,107	Orlando - - - - -	29,109	Wilmington, Del. - - -	32,111	Reno - - - - -	34,113
Syracuse - - - - -	26,107	Philadelphia - - - - -	87			Salt Lake City - - - -	35,113
Washington, D.C. - - -	26,107						

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San Francisco	91,	Los Angeles	37,115	Washington, D. C.	41,118	Las Vegas	96
Seattle	35,113	San Francisco	37,116			Los Angeles	96
<b>BOSTON</b>		<b>BURLINGTON</b>		<b>CHARLOTTE</b>		<b>LOUISVILLE</b>	
Albany, N. Y.	24,106	Boston	35,114	Asheville	27,108	Madison	43,120
Baltimore	30,110	Montpelier	38,116	Atlanta	27,108	Memphis	43,120
Bangor	32,111			Baltimore	31,110	Miami	97
Buffalo	35,113	<b>BUTTE</b>		Birmingham	33,112	Milwaukee	43,120
Burlington	35,114	Bozeman	36,115	Charleston, S. C.	39,117	Minneapolis	43,120
Chicago	91	Great Falls	38,116	Charleston, W. Va.	40,117	Moline	43,120
Cleveland	91	Helena	38,116	Chattanooga	41,118	Montreal	97
Concord	35,114	Idaho Falls	38,116	Chicago	94	Muskegon	43,120
Dallas	91			Cleveland	41,118	Nashville	43,120
Denver	91	<b>CALGARY</b>		Columbia	41,118	New Orleans	97
Detroit	92	Cranbrook	38,116	Columbus, Ohio	41,118	New York	97
Fitchburg	35,114	Edmonton	38,116	Danville	41,118	Omaha	97
Hartford	35,114	Great Falls	38,116	Greensboro	41,118	Philadelphia	97
Hyannis	35,114	Lethbridge	38,116	Greenville	41,118	Phoenix	97
Lebanon	35,114	Regina	38,116	Jacksonville	41,118	Pittsburgh	43,120
Lewiston	35,114	Saskatoon	38,116	Miami	94	Portland, Ore.	97
Los Angeles	92	Toronto	93	New York	94	Providence	98
Manchester	35,114	Vancouver	38,116	Philadelphia	41,118	Rochester, Minn.	98
Miami	92			Raleigh	41,118	Rochester, N. Y.	44,120
Montreal	35,114	<b>CARLSBAD</b>		Richmond	41,118	Saginaw	44,120
New Bedford	35,114	El Paso	38,116	Spartanburg	42,119	St. Louis	44,120
New York	35,114	Hobbs	38,116	Washington, D. C.	42,119	Salt Lake City	98
Philadelphia	36,114					San Francisco	98
Pittsburgh	92	<b>CASPER</b>		<b>CHATTANOOGA</b>		Seattle	98
Portland, Me.	36,114	Billings	33,112	Atlanta	27,108	South Bend	44,120
Providence	36,114	Cheyenne	38,116	Birmingham	33,112	Spokane	98
San Francisco	92	Denver	39,116	Charlotte	41,118	Springfield, Ill.	44,120
Syracuse	36,114	Rapid City	39,116	Cincinnati	42,119	Tampa	98
Tampa	92	Salt Lake City	39,116	Cleveland	41	Toledo	44,120
Washington, D. C.	36,114	Sheridan	39,116	Greenville	42,119	Toronto	44,120
Worcester	36,114			Knoxville	42,119	Tucson	98
		<b>CASTLEGAR</b>		Lexington	42,119	Tulsa	98
<b>BOWLING GREEN</b>		Cranbrook	39,117	Memphis	42,119	Washington, D. C.	99
Louisville	36,114	Penticton	39,117	Nashville	42,119	Waterloo	44,120
Nashville	36,114			Rome	42,119	West Palm Beach	99
		<b>CEDAR RAPIDS</b>		Washington, D. C.	95		
<b>BOZEMAN</b>		Chicago	39,117	<b>CHEYENNE</b>		<b>CINCINNATI</b>	
Billings	33,112	Des Moines	39,117	Casper	38,116	Akron	23,105
Butte	36,115	Minneapolis	39,117	Denver	42,119	Atlanta	28,108
		Moline	39,117			Charleston, W. Va.	40,117
<b>BRISTOL</b>				<b>CHICAGO</b>		Chattanooga	42,119
Asheville	27,108	<b>CHARLESTON, S. C.</b>		Akron	23,105	Chicago	42,119
Charleston, W. Va.	36,115	Atlanta	27,108	Albuquerque	83	Cleveland	44,120
Knoxville	36,115	Augusta, Ga.	29,110	Anchorage	85	Columbus, Ohio	44,120
		Charlotte	39,117	Atlanta	86	Dallas	99
<b>BROWNSVILLE</b>		Columbia	39,117	Baltimore	88	Dayton	44,121
Corpus Christi	36,115	Florence	39,117	Birmingham	90	Detroit	44,121
		Jacksonville	39,117	Boston	91	Ft. Lauderdale	99
<b>BRUNSWICK</b>		Norfolk	40,117	Buffalo	36,115	Indianapolis	44,121
Jacksonville	36,115	Savannah	40,117	Cedar Rapids	39,117	Knoxville	44,121
Savannah	37,115	Wilmington, N. C.	40,117	Charlotte	94	Lexington	45,121
				Cincinnati	42,119	Los Angeles	99
<b>BUFFALO</b>		<b>CHARLESTON, W. VA.</b>		Cleveland	42,119	Louisville	45,121
Albany, N. Y.	24,106	Akron	23,105	Columbus, Ohio	42,119	Miami	99
Baltimore	31,110	Atlanta	27,108	Dallas	95	Nashville	45,121
Boston	35,113	Bristol	36,115	Dayton	42,119	New York	99
Chicago	36,115	Charlotte	40,117	Denver	95	Pittsburgh	45,121
Cleveland	37,115	Cincinnati	40,117	Des Moines	43,119	St. Louis	45,121
Detroit	37,115	Cleveland	40,117	Detroit	43,119	St. Petersburg	99
Elmira	37,115	Columbus, Ohio	40,117	Evansville	43,119	Tampa	100
New York	37,115	Greensboro	40,117	Ft. Lauderdale	96	Washington, D. C.	45,121
Philadelphia	37,115	Huntington	40,117	Grand Rapids	43,119		
Pittsburgh	37,115	Huntsville	40,118	Greensboro	96	<b>CLEVELAND</b>	
Rochester, N. Y.	37,115	Knoxville	40,118	Harrisburg	96	Akron	23,105
Scranton	37,115	Lexington	40,118	Hartford	96	Allentown	26,107
Syracuse	37,115	Louisville	40,118	Honolulu	96	Atlanta	86
Tampa	93	New York	40,118	Houston	96	Boston	91
Toronto	37,115	Pittsburgh	41,118	Indianapolis	43,119	Buffalo	37,115
Washington, D. C.	37,115	Roanoke	41,118	Kansas City	43,120	Charleston, W. Va.	40,117
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Salem	- 53, 127

<b>EVANSVILLE</b>		<b>FT. WAYNE (Continued)</b>		<b>GREAT FALLS</b>		<b>HOBBS (Continued)</b>	
Chicago - - - - -	43,119	South Bend - - - - -	55,129	Billings - - - - -	33,112	Midland - - - - -	60,132
Indianapolis - - - - -	54,127	Toledo - - - - -	55,129	Butte - - - - -	38,116	Roswell - - - - -	60,132
Louisville - - - - -	54,127			Calgary - - - - -	38,116		
Nashville - - - - -	54,127	<b>FT. WILLIAM</b>		Helena - - - - -	57,130	<b>HONOLULU</b>	
Owensboro - - - - -	54,128	Sault Ste. Marie - - - - -	55,129	Missoula - - - - -	57,130	Chicago - - - - -	96
Paducah - - - - -	54,128	Toronto - - - - -	110	Salt Lake City - - - - -	58,130	Los Angeles - - - - -	112
St. Louis - - - - -	54,128	Winnipeg - - - - -	55,129	Spokane - - - - -	58,130	New York - - - - -	112
						Portland, Ore. - - - - -	112
						San Francisco - - - - -	112
						Seattle - - - - -	112
						Vancouver - - - - -	112
<b>FAIRBANKS</b>		<b>FT. WORTH</b>		<b>GREENSBORO</b>		<b>HOT SPRINGS</b>	
Anchorage - - - - -	85	Abilene - - - - -	23,105	Asheville - - - - -	27,108	Little Rock - - - - -	60,132
Juneau - - - - -	109	Austin - - - - -	30,110	Atlanta - - - - -	28,108	Shreveport - - - - -	60,132
San Francisco - - - - -	109	Dallas - - - - -	48,124	Birmingham - - - - -	33,112		
Seattle - - - - -	109	El Paso - - - - -	108	Charleston, W. Va. - - - - -	40,117		
Whitehorse - - - - -	109	Houston - - - - -	56,129	Charlotte - - - - -	41,118		
		Little Rock - - - - -	56,129	Chicago - - - - -	96		
<b>FARGO</b>		Los Angeles - - - - -	110	Danville - - - - -	50,125		
Bismark - - - - -	34,113	New Orleans - - - - -	56,129	Greenville - - - - -	58,130	<b>HOULTON</b>	
Grand Forks - - - - -	54,128	Oklahoma City - - - - -	56,129	Louisville - - - - -	58,130	Bangor - - - - -	32,111
Jamestown - - - - -	54,128	Shreveport - - - - -	56,129	New York - - - - -	58,131	Presque Isle - - - - -	60,132
Minneapolis - - - - -	54,128	Waco - - - - -	56,129	Pittsburgh - - - - -	58,131		
Winnipeg - - - - -	54,128	Wichita Falls - - - - -	56,129	Raleigh - - - - -	58,131		
				Richmond - - - - -	58,131	<b>HOUSTON</b>	
				Roanoke - - - - -	58,131	Abilene - - - - -	23,105
				Washington, D. C. - - - - -	58,131	Atlanta - - - - -	86
<b>FAYETTEVILLE</b>		<b>FREDERICTON</b>				Austin - - - - -	30,110
New Bern - - - - -	109	Montreal - - - - -	56,129	<b>GREENVILLE</b>		Baltimore - - - - -	89
Wilmington, N. C. - - - - -	109	Quebec - - - - -	56,129	Anderson - - - - -	27,108	Beaumont - - - - -	32,112
		St. John - - - - -	56,129	Atlanta - - - - -	28,108	Chicago - - - - -	96
<b>FITCHBURG</b>				Charlotte - - - - -	41,118	College Station - - - - -	46,122
Boston - - - - -	35,114	<b>FRESNO</b>		Chattanooga - - - - -	42,119	Corpus Christi - - - - -	48,123
Concord - - - - -	48,123	Bakersfield - - - - -	30,110	Columbia - - - - -	47,122	Dallas - - - - -	48,124
		Los Angeles - - - - -	56,129	Greensboro - - - - -	58,130	El Paso - - - - -	108
<b>FLINT</b>		Merced - - - - -	56,129	Richmond - - - - -	58,131	Ft. Worth - - - - -	56,129
Detroit - - - - -	52,126	Oakland - - - - -	56,129	Spartanburg - - - - -	58,131	Lake Charles - - - - -	60,132
Grand Rapids - - - - -	54,128	San Francisco - - - - -	56,130	Winston-Salem - - - - -	58,131	Las Vegas - - - - -	112
New York - - - - -	109	Visalia - - - - -	57,130			Los Angeles - - - - -	112
Saginaw - - - - -	54,128					Miami - - - - -	113
		<b>GAINESVILLE</b>		<b>HALIFAX</b>		Nashville - - - - -	113
<b>FLORENCE</b>		Jacksonville - - - - -	57,130	Moncton - - - - -	58,131	New Orleans - - - - -	60,132
Charleston, S. C. - - - - -	39,117	Ocala - - - - -	57,130	Montreal - - - - -	112	New York - - - - -	113
Columbia - - - - -	47,122			St. John - - - - -	59,131	St. Louis - - - - -	113
Raleigh - - - - -	54,128	<b>GANDER</b>		Sydney - - - - -	59,131	San Antonio - - - - -	60,132
		Montreal - - - - -	111			San Francisco - - - - -	113
<b>FT. LAUDERDALE</b>		St. Johns - - - - -	57,130	<b>HARRISBURG</b>		Shreveport - - - - -	60,132
Chicago - - - - -	96	Stephenville - - - - -	57,130	Allentown - - - - -	26,107	Tulsa - - - - -	60,132
Cincinnati - - - - -	99			Baltimore - - - - -	31,111	Washington, D. C. - - - - -	113
Miami - - - - -	54,128	<b>GLENS FALLS</b>		Chicago - - - - -	96		
New York - - - - -	109	Albany, N. Y. - - - - -	25,106	Pittsburgh - - - - -	59,131	<b>HUNTINGTON</b>	
Washington, D. C. - - - - -	110			Reading - - - - -	59,131	Charleston, W. Va. - - - - -	40,117
West Palm Beach - - - - -	55,128	<b>GOOSE BAY</b>		Washington, D. C. - - - - -	59,131	Lexington - - - - -	60,132
		Montreal - - - - -	111	Williamsport - - - - -	59,131	Louisville - - - - -	60,132
<b>FT. MEYERS</b>						Washington, D. C. - - - - -	113
Sarasota - - - - -	55,128	<b>GRAND FORKS</b>		<b>HARTFORD</b>			
West Palm Beach - - - - -	55,128	Fargo - - - - -	54,128	Albany, N. Y. - - - - -	25,106	<b>HUNTSVILLE</b>	
		Winnipeg - - - - -	57,130	Boston - - - - -	35,114	Birmingham - - - - -	33,112
<b>FT. NELSON</b>				Chicago - - - - -	96	Charleston, W. Va. - - - - -	40,118
Ft. St. John - - - - -	55,128	<b>GRAND JUNCTION</b>		Cleveland - - - - -	100	Knoxville - - - - -	60,132
Watson Lake - - - - -	110	Denver - - - - -	51,125	Dayton - - - - -	104	Lexington - - - - -	60,132
Whitehorse - - - - -	110	Las Vegas - - - - -	57,130	Los Angeles - - - - -	112	Louisville - - - - -	61,133
				New Haven - - - - -	59,131	Memphis - - - - -	61,133
<b>FT. ST. JOHN</b>		<b>GRAND PRAIRIE</b>		New York - - - - -	59,131	Nashville - - - - -	61,133
Ft. Nelson - - - - -	55,128	Edmonton - - - - -	53,127	Philadelphia - - - - -	59,131	Washington, D. C. - - - - -	61,133
Grand Prairie - - - - -	55,128	Ft. St. John - - - - -	55,128	Pittsburgh - - - - -	59,132		
Prince George - - - - -	55,128			Pittsfield - - - - -	59,132		
		<b>GRAND RAPIDS</b>		Providence - - - - -	59,132	<b>HURON</b>	
<b>FT. SMITH</b>		Chicago - - - - -	43,119	Washington, D. C. - - - - -	59,132	Pierre - - - - -	61,133
Little Rock - - - - -	55,128	Cleveland - - - - -	45,121			Sioux Falls - - - - -	61,133
Texarkana - - - - -	55,128	Detroit - - - - -	52,126	<b>HELENA</b>			
Tulsa - - - - -	55,129	Flint - - - - -	54,128	Butte - - - - -	38,116	<b>HYANNIS</b>	
		Land O'Lakes - - - - -	57,130	Great Falls - - - - -	57,130	Boston - - - - -	35,114
<b>FT. WAYNE</b>		Lansing - - - - -	57,130	Missoula - - - - -	59,132	Nantucket - - - - -	61,133
Cleveland - - - - -	45,121	Milwaukee - - - - -	57,130				
Dayton - - - - -	50,125	Muskegon - - - - -	57,130	<b>HOBBS</b>		<b>IDAHO FALLS</b>	
Indianapolis - - - - -	55,129	Saginaw - - - - -	57,130	Carlsbad - - - - -	38,116	Butte - - - - -	38,116
New York - - - - -	110					Pocatello - - - - -	61,133

## IDAHO FALLS (Continued)

Salt Lake City - - - - 61,133

## INDIANAPOLIS

Atlanta - - - - - 28,108  
 Chicago - - - - - 43,119  
 Cincinnati - - - - 44,121  
 Cleveland - - - - - 45,121  
 Columbus, Ohio - - - 48,123  
 Dayton - - - - - 50,125  
 Detroit - - - - - 52,126  
 Evansville - - - - - 54,127  
 Ft. Wayne - - - - - 55,129  
 Louisville - - - - - 61,133  
 Memphis - - - - - 61,133  
 Nashville - - - - - 61,133  
 New York - - - - - 114  
 Pittsburgh - - - - - 61,133  
 St. Louis - - - - - 61,133  
 Terre Haute - - - - 62,133

## JACKSON

Birmingham - - - - 33,112  
 Dallas - - - - - 49,124  
 Memphis - - - - - 62,133  
 Meridian - - - - - 62,133  
 Monroe - - - - - 62,133  
 New Orleans - - - - 62,133  
 Shreveport - - - - - 62,134

## JACKSONVILLE

Atlanta - - - - - 28,109  
 Augusta, Ga. - - - - 29,110  
 Brunswick - - - - - 36,115  
 Charleston, S. C. - - 39,117  
 Charlotte - - - - - 41,118  
 Columbia - - - - - 47,122  
 Daytona Beach - - - - 50,125  
 Gainesville - - - - - 57,130  
 Macon - - - - - 62,134  
 Melbourne - - - - - 62,134  
 Miami - - - - - 62,134  
 New Orleans - - - - - 114  
 New York - - - - - 114  
 Orlando - - - - - 62,134  
 Pittsburgh - - - - - 114  
 Sarasota - - - - - 62,134  
 Savannah - - - - - 62,134  
 Tallahassee - - - - 62,134  
 Tampa - - - - - 62,134  
 Washington, D. C. - - 114  
 Waycross - - - - - 63,134  
 West Palm Beach - - - 63,134

## JAMESTOWN

Bismark - - - - - 34,113  
 Fargo - - - - - 54,128

## JOPLIN

Springfield, Mo. - - - 63,134  
 Tulsa - - - - - 63,134

## JUNEAU

Anchorage - - - - - 85  
 Annette Island - - - - 85  
 Fairbanks - - - - - 109  
 Seattle - - - - - 114

## KANSAS CITY

Baltimore - - - - - 89  
 Chicago - - - - - 43,120  
 Dallas - - - - - 49,124  
 Denver - - - - - 104  
 Des Moines - - - - - 51,126

## KANSAS CITY (Continued)

Los Angeles - - - - - 114  
 Minneapolis - - - - - 63,134  
 New York - - - - - 115  
 Omaha - - - - - 63,134  
 Phoenix - - - - - 115  
 St. Louis - - - - - 63,134  
 Springfield, Mo. - - - 63,134  
 Tulsa - - - - - 63,134  
 Washington, D. C. - - 115  
 Wichita - - - - - 63,134

## KEENE

New York - - - - - 63,135  
 Pittsfield - - - - - 63,135

## KEY WEST

Miami - - - - - 63,135

## KING SALMON

Anchorage - - - - - 85

## KNOXVILLE

Asheville - - - - - 27  
 Atlanta - - - - - 28,109  
 Birmingham - - - - - 33,113  
 Bristol - - - - - 36,115  
 Charleston, W. Va. - - 40,118  
 Chattanooga - - - - - 42,119  
 Cincinnati - - - - - 44,121  
 Cleveland - - - - - 45,121  
 Huntsville - - - - - 60,132  
 Lexington - - - - - 63,135  
 Louisville - - - - - 64,135  
 Memphis - - - - - 64,135  
 Nashville - - - - - 64,135  
 New York - - - - - 115  
 Pittsburgh - - - - - 64,135  
 Washington, D. C. - - 64,135

## KODIAK

Seattle - - - - - 115

## LACONIA

Concord - - - - - 48,123

## LAFAYETTE

Baton Rouge - - - - - 32,111  
 Lake Charles - - - - - 64,135

## LAKE CHARLES

Baton Rouge - - - - - 32,112  
 Beaumont - - - - - 32,112  
 Houston - - - - - 60,132  
 Lafayette - - - - - 64,135

## LAKELAND

Daytona Beach - - - - 50,125  
 Tampa - - - - - 64,135

## LANCASTER

Baltimore - - - - - 31,111  
 Reading - - - - - 64,135  
 Washington, D. C. - - 64,135

## LAND O'LAKES

Detroit - - - - - 52,126  
 Grand Rapids - - - - - 57,130  
 New York - - - - - 115

## LANSING

Detroit - - - - - 52,126  
 Grand Rapids - - - - - 57,130

## LAS VEGAS

Albuquerque - - - - - 83  
 Chicago - - - - - 96  
 Dallas - - - - - 102  
 Denver - - - - - 104  
 Detroit - - - - - 106  
 Grand Junction - - - - 57,130  
 Houston - - - - - 112  
 Los Angeles - - - - - 64,135  
 Palm Springs - - - - - 64,135  
 Phoenix - - - - - 64,135  
 Sacramento - - - - - 64,135  
 Salt Lake City - - - - 65,135  
 San Francisco - - - - - 65,136

## LAWRENCE

Manchester - - - - - 65,136  
 Worcester - - - - - 65,136

## LAWTON

Dallas - - - - - 49,124  
 Oklahoma City - - - - 65,136  
 Wichita Falls - - - - - 65,136

## LEBANON

Boston - - - - - 35,114  
 Manchester - - - - - 65,136  
 Montpelier - - - - - 65,136

## LETHBRIDGE

Calgary - - - - - 38,116

## LEVISTON

Augusta, Me. - - - - - 30,110  
 Boston - - - - - 35  
 Portland, Me. - - - - - 65,136

## LEXINGTON

Charleston, W. Va. - - 40,118  
 Chattanooga - - - - - 42,119  
 Cincinnati - - - - - 45,121  
 Huntington - - - - - 60,132  
 Huntsville - - - - - 60,132  
 Knoxville - - - - - 63,135  
 Louisville - - - - - 65,136

## LINCOLN

Denver - - - - - 51,125  
 Omaha - - - - - 65,136

## LITTLE ROCK

Dallas - - - - - 49,124  
 Ft. Smith - - - - - 55,128  
 Ft. Worth - - - - - 56,129  
 Hot Springs - - - - - 60,132  
 Memphis - - - - - 65,136  
 St. Louis - - - - - 65,136  
 Shreveport - - - - - 65,136  
 Springfield, Mo. - - - - 66,136

## LONG BEACH

Los Angeles - - - - - 66,136  
 San Diego - - - - - 66,136

## LOS ANGELES

Albuquerque - - - - - 84  
 Anchorage - - - - - 85  
 Atlanta - - - - - 86  
 Bakersfield - - - - - 30,110  
 Baltimore - - - - - 89  
 Boston - - - - - 92  
 Burbank - - - - - 37,115  
 Chicago - - - - - 96  
 Cincinnati - - - - - 99

## LOS ANGELES (Continued)

Cleveland - - - - - 100  
 Dallas - - - - - 102  
 Dayton - - - - - 104  
 Denver - - - - - 104  
 Des Moines - - - - - 106  
 Detroit - - - - - 106  
 El Paso - - - - - 108  
 Ft. Worth - - - - - 110  
 Fresno - - - - - 56,129  
 Hartford - - - - - 112  
 Honolulu - - - - - 112  
 Houston - - - - - 112  
 Kansas City - - - - - 114  
 Las Vegas - - - - - 64,135  
 Long Beach - - - - - 66,136  
 Miami - - - - - 116  
 Montreal - - - - - 116  
 New Orleans - - - - - 116  
 New York - - - - - 116  
 Oklahoma City - - - - 116  
 Ontario - - - - - 66,136  
 Palm Springs - - - - - 66,136  
 Philadelphia - - - - - 116  
 Phoenix - - - - - 66,136  
 Pittsburgh - - - - - 116  
 Portland, Ore. - - - - 117  
 Sacramento - - - - - 66,137  
 St. Louis - - - - - 117  
 Salt Lake City - - - - 117  
 San Diego - - - - - 66,137  
 San Francisco - - - - - 66,137  
 Santa Barbara - - - - 66,137  
 Seattle - - - - - 117  
 Syracuse - - - - - 117  
 Tampa - - - - - 117  
 Tucson - - - - - 66,137

## LOUISVILLE

Atlanta - - - - - 28,109  
 Bowling Green - - - - 36,114  
 Charleston, W. V. - - - 40,118  
 Chicago - - - - - 43,120  
 Cincinnati - - - - - 45,121  
 Columbus, Ohio - - - - 48,123  
 Dallas - - - - - 102  
 Detroit - - - - - 52,126  
 Evansville - - - - - 54,127  
 Greensboro - - - - - 58,130  
 Huntington - - - - - 60,132  
 Huntsville - - - - - 61,133  
 Indianapolis - - - - - 61,133  
 Knoxville - - - - - 64,135  
 Lexington - - - - - 65,136  
 Memphis - - - - - 66,137  
 Nashville - - - - - 66,137  
 New York - - - - - 117  
 Owensboro - - - - - 66,137  
 St. Louis - - - - - 67,137  
 St. Petersburg - - - - 118  
 Tampa - - - - - 118  
 Washington, D. C. - - 118

## LUBBOCK

Abilene - - - - - 23,105  
 Albuquerque - - - - - 25,106  
 Amarillo - - - - - 26,107  
 Clovis - - - - - 46,122  
 Dallas - - - - - 49,124  
 Denver - - - - - 51,125  
 Midland - - - - - 67,137  
 Wichita Falls - - - - - 67,137

<b>MACON</b>		<b>MIAMI (Continued)</b>		<b>MISSOULA</b>		<b>MUSCLE SHOALS</b>	
Albany, Ga. - - - - -	24,106	Chicago - - - - -	97,	Great Falls - - - - -	57,130	Birmingham - - - - -	34,113
Atlanta - - - - -	28,109	Cincinnati - - - - -	99	Helena - - - - -	59,132	Nashville - - - - -	70,140
Jacksonville - - - - -	62,134	Cleveland - - - - -	100	Spokane - - - - -	69,139		
Savannah - - - - -	67,137	Dallas - - - - -	103,124			<b>MUSKEGON</b>	
Waycross - - - - -	67,137	Daytona Beach - - - - -	50,125	<b>MOBILE</b>		Chicago - - - - -	43,120
		Detroit - - - - -	107	Atlanta - - - - -	28,109	Grand Rapids - - - - -	57,130
<b>MADISON</b>		Ft. Lauderdale - - - - -	54,128	Birmingham - - - - -	34,113	Milwaukee - - - - -	69,139
Chicago - - - - -	43,120	Houston - - - - -	113	Montgomery - - - - -	69,139		
Milwaukee - - - - -	67,137	Jacksonville - - - - -	62,134	New Orleans - - - - -	69,139	<b>NANTUCKET</b>	
Rochester, Minn. - - - - -	67,137	Key West - - - - -	63,135	Pensacola - - - - -	69,139	Hyannis - - - - -	61,133
		Los Angeles - - - - -	116				
<b>MANCHESTER</b>		Melbourne - - - - -	67,138	<b>MODESTO</b>		<b>NASHVILLE</b>	
Boston - - - - -	35,114	Minneapolis - - - - -	118	Merced - - - - -	68,138	Atlanta - - - - -	29,109
Lawrence - - - - -	65,136	Montreal - - - - -	118	Stockton - - - - -	69,139	Bowling Green - - - - -	36,114
Lebanon - - - - -	65,136	New Orleans - - - - -	118			Chattanooga - - - - -	42,119
Worcester - - - - -	67,137	New York - - - - -	119	<b>MOLINE</b>		Chicago - - - - -	43,120
		Orlando - - - - -	68,138	Cedar Rapids - - - - -	39,117	Cincinnati - - - - -	45,121
<b>MARTHA'S VINEYARD</b>		Philadelphia - - - - -	119	Chicago - - - - -	43,120	Evansville - - - - -	54,127
New Bedford - - - - -	67,137	Pittsburgh - - - - -	119			Houston - - - - -	113
		St. Louis - - - - -	119	<b>MONCTON</b>		Huntsville - - - - -	61,133
<b>MCALESTER</b>		St. Petersburg - - - - -	68,138	Halifax - - - - -	58,131	Indianapolis - - - - -	61,133
Dallas - - - - -	49,124	San Francisco - - - - -	119	Montreal - - - - -	70,139	Knoxville - - - - -	64,135
		San Juan - - - - -	119	St. John - - - - -	70,139	Louisville - - - - -	66,137
<b>MEDFORD</b>		Seattle - - - - -	119	Toronto - - - - -	120	Memphis - - - - -	68,138
Eugene - - - - -	53,127	Tallahassee - - - - -	68,138			Muscle Shoals - - - - -	70,140
Sacramento - - - - -	67,137	Tampa - - - - -	68,138	<b>MONROE</b>		New York - - - - -	121
San Francisco - - - - -	67,137	Washington, D. C. - - - - -	119	Dallas - - - - -	49,124	St. Louis - - - - -	71,140
		West Palm Beach - - - - -	69,138	Jackson - - - - -	62,133	Tulsa - - - - -	121
				Meridian - - - - -	68,138	Washington, D. C. - - - - -	121
<b>MELBOURNE</b>				Shreveport - - - - -	70,139		
Atlanta - - - - -	28,109	<b>MIDLAND</b>				<b>NEW BEDFORD</b>	
Daytona Beach - - - - -	50,125	Abilene - - - - -	23,105	<b>MONTEREY</b>		Boston - - - - -	35,114
Jacksonville - - - - -	62,134	Big Spring - - - - -	32,112	Salinas - - - - -	70,139	Martha's Vineyard - - - - -	67,137
Miami - - - - -	67,138	Dallas - - - - -	49,124	San Francisco - - - - -	70,139	New York - - - - -	71,140
Orlando - - - - -	67,138	El Paso - - - - -	53,127	Santa Barbara - - - - -	70,139		
Tampa - - - - -	67,138	Hobbs - - - - -	60,132			<b>NEW BERN</b>	
Vero Beach - - - - -	68,138	Lubbock - - - - -	67,137	<b>MONTGOMERY</b>		Fayetteville - - - - -	109
West Palm Beach - - - - -	68,138	San Agnelo - - - - -	69,138	Atlanta - - - - -	28,109	Norfolk - - - - -	71,140
				Birmingham - - - - -	34,113		
<b>MEMPHIS</b>				Columbia - - - - -	47,122	<b>NEW HAVEN</b>	
Atlanta - - - - -	28,109	<b>MILWAUKEE</b>		Columbus, Ga. - - - - -	47,123	Hartford - - - - -	59,131
Birmingham - - - - -	33,113	Chicago - - - - -	43,120	Dothan - - - - -	52,127	New York - - - - -	71,140
Chattanooga - - - - -	42,119	Cleveland - - - - -	45,121	Meridian - - - - -	68,138		
Chicago - - - - -	97	Denver - - - - -	105	Mobile - - - - -	69,139	<b>NEW ORLEANS</b>	
Dallas - - - - -	49,124	Detroit - - - - -	52,126	Pensacola - - - - -	70,139	Atlanta - - - - -	29,109
Huntsville - - - - -	61,133	Grand Rapids - - - - -	57,130			Baton Rouge - - - - -	32,111
Indianapolis - - - - -	61,133	Madison - - - - -	67,137	<b>MONTPELIER</b>		Birmingham - - - - -	34,111
Jackson - - - - -	62,133	Minneapolis - - - - -	69,139	Burlington - - - - -	38,116	Chicago - - - - -	97
Knoxville - - - - -	64,135	Muskegon - - - - -	69,139	Lebanon - - - - -	65,136	Dallas - - - - -	49,121
Little Rock - - - - -	65,136	New York - - - - -	119			Ft. Worth - - - - -	56,125
Louisville - - - - -	66,137	Philadelphia - - - - -	119	<b>MONTREAL</b>		Houston - - - - -	60,132
Nashville - - - - -	68,138	Toledo - - - - -	69,139	Baltimore - - - - -	31,111	Jackson - - - - -	62,133
New Orleans - - - - -	68,138	Washington, D. C. - - - - -	120	Boston - - - - -	35,114	Jacksonville - - - - -	114
Paducah - - - - -	68,138			Chicago - - - - -	97	Los Angeles - - - - -	116
St. Louis - - - - -	68,138	<b>MINNEAPOLIS</b>		Edmonton - - - - -	108	Memphis - - - - -	68,138
Shreveport - - - - -	68,138	Anchorage - - - - -	85	Fredericton - - - - -	56,129	Miami - - - - -	118
Washington, D. C. - - - - -	118	Bismark - - - - -	34,113	Gander - - - - -	111	Mobile - - - - -	69,139
		Cedar Rapids - - - - -	39,117	Goose Bay - - - - -	111	New York - - - - -	121
<b>MERCED</b>		Chicago - - - - -	43,120	Halifax - - - - -	112	St. Petersburg - - - - -	121
Fresno - - - - -	56,129	Denver - - - - -	105	Los Angeles - - - - -	116	Shreveport - - - - -	71,140
Modesto - - - - -	68,138	Des Moines - - - - -	51,126	Miami - - - - -	118	Tampa - - - - -	122
		Detroit - - - - -	107	Moncton - - - - -	70,139		
<b>MERIDIAN</b>		Edmonton - - - - -	108	New York - - - - -	70,140	<b>NEWPORT NEWS</b>	
Birmingham - - - - -	34,113	Fargo - - - - -	54,128	Ottawa - - - - -	70,140	New York - - - - -	71,140
Columbia - - - - -	47,122	Kansas City - - - - -	63,134	Quebec - - - - -	70,140	Norfolk - - - - -	71,140
Jackson - - - - -	62,133	Miami - - - - -	118	Saguenay - - - - -	70,140	Washington, D. C. - - - - -	71,140
Monroe - - - - -	68,138	Milwaukee - - - - -	69,139	St. John - - - - -	70,140		
Montgomery - - - - -	68,138	New York - - - - -	120	Tampa - - - - -	121	<b>NEW YORK</b>	
		Omaha - - - - -	69,139	Toronto - - - - -	70,140	Akron - - - - -	24,105
<b>MIAMI</b>		Rochester, Minn. - - - - -	69,139	Vancouver - - - - -	121	Albany, N. Y. - - - - -	25,106
Atlanta - - - - -	87,109	Salt Lake City - - - - -	120	Washington, D. C. - - - - -	121	Allentown - - - - -	26,110
Baltimore - - - - -	89	Seattle - - - - -	120			Anchorage - - - - -	85
Boston - - - - -	92	Sioux Falls - - - - -	69,139			Atlanta - - - - -	87
Charlotte - - - - -	94	Spokane - - - - -	120				
		Washington, D. C. - - - - -	120				
		Winnipeg - - - - -	69,139				

<b>NEW YORK (Continued)</b>		<b>NORTH BAY</b>		<b>PANAMA CITY</b>		<b>PITTSBURGH</b>	
Atlantic City	29,109	Sudbury	72,141	Tallahassee	74,142	Charleston, W. Va.	41,118
Baltimore	31,111	Toronto	72,141	Tampa	74,142	Chicago	43,120
Birmingham	90	<b>OAKLAND</b>		<b>PENDLETON</b>		Cincinnati	45,121
Boston	35,114	Fresno	56,129	Boise	34,113	Cleveland	46,122
Buffalo	37,115	Phoenix	123	<b>PENSACOLA</b>		Columbus, Ohio	48,123
Charleston, W. Va.	40,118	Reno	73,141	Birmingham	34,113	Dayton	50,125
Charlotte	94	Salt Lake City	123	Columbia	47,122	Detroit	52,126
Chicago	97	San Francisco	73,141	Columbus, Ga.	47,123	Greensboro	58,131
Cincinnati	99	<b>OCALA</b>		Mobile	69,139	Harrisburg	59,131
Cleveland	46,121	Gainesville	57,130	Montgomery	70,139	Hartford	59,132
Columbus, Ohio	101	Vero Beach	73,141	<b>PENTICTON</b>		Indianapolis	61,133
Dallas	103	<b>OKLAHOMA CITY</b>		Castlegar	39,117	Jacksonville	114
Dayton	104	Amarillo	26,107	<b>PHILADELPHIA</b>		Knoxville	64,135
Denver	105	Colorado Springs	46,122	Allentown	26,107	Los Angeles	116
Detroit	107	Dallas	49,124	Atlanta	87	Miami	119
Flint	109	Ft. Worth	56,129	Baltimore	31,111	New York	71,140
Ft. Lauderdale	109	Lawton	65,136	Boston	36,114	Philadelphia	74,142
Ft. Wayne	110	Los Angeles	116	Buffalo	37,115	Raleigh	75,143
Greensboro	58,131	St. Louis	123	Charlotte	41,118	Roanoke	75,143
Hartford	59,131	Tulsa	73,142	Chicago	97	St. Petersburg	124
Honolulu	112	Wichita	73,142	Cleveland	46,122	Toledo	75,143
Houston	113	<b>OMAHA</b>		Columbus, Ohio	48,123	Washington, D. C.	75,143
Indianapolis	114	Chicago	97	Detroit	52,126	Williamsport	75,143
Jacksonville	114	Denver	51,125	Hartford	59,131	Youngstown	75,143
Kansas City	115	Des Moines	51,126	Los Angeles	116	<b>PITTSFIELD</b>	
Keene	63,135	Detroit	107	Miami	119	Hartford	59,132
Knoxville	115	Kansas City	63,134	Milwaukee	119	Keene	63,135
Land O'Lakes	115	Lincoln	65,136	New York	71,140	<b>POCATELLO</b>	
Los Angeles	116	Minneapolis	69,139	Norfolk	72,141	Idaho Falls	61,133
Louisville	117	Sioux City	73,142	Pittsburgh	74,142	Salt Lake City	75,143
Miami	119	<b>ONTARIO</b>		Richmond	74,142	<b>PORT HARDY</b>	
Milwaukee	119	Los Angeles	66	Rochester, N. Y.	74,142	Comox	48,123
Minneapolis	120	Palm Springs	73,142	St. Louis	124	<b>PORTLAND, ME.</b>	
Montreal	70,140	San Francisco	73,142	San Juan	124	Bangor	32,111
Nashville	121	<b>ORLANDO</b>		Scranton	74,143	Boston	36,114
New Bedford	71,140	Atlanta	29,109	Syracuse	74,143	Lewiston	65,136
New Haven	71,140	Dallas	103	Washington, D. C.	74,143	New York	71,141
New Orleans	121	Daytona Beach	50,125	Williamsport	74,143	Waterville	75,143
Newport News	71,140	Jacksonville	62,134	Youngstown	74,143	<b>PORTLAND, ORE.</b>	
Norfolk	71,140	Melbourne	67,138	<b>PHOENIX</b>		Boise	34,113
Philadelphia	71,140	Miami	68,138	Albuquerque	25,106	Chicago	97
Phoenix	122	Sarasota	73,142	Baltimore	89	Denver	105
Pittsburgh	71,140	Tallahassee	73,142	Chicago	97	Honolulu	112
Portland, Me.	71,141	Tampa	73,142	Denver	105	Los Angeles	117
Providence	71,140	West Palm Beach	73,142	El Paso	53,127	Reno	75
Raleigh	71,141	<b>OTTAWA</b>		Kansas City	115	Salem	75,143
Reading	72,141	Montreal	70,140	Las Vegas	64,135	Salt Lake City	124
Richmond	72,141	Syracuse	73,142	Los Angeles	66	San Francisco	124
Rochester, N. Y.	72,141	Toronto	73,142	New York	122	Seattle	75,144
St. Louis	122	Val D'or	74,142	Oakland	123	Spokane	76,144
San Francisco	122	<b>OWENSBORO</b>		San Diego	74,143	Yakima	76,144
Scranton	72,141	Evansville	54,128	San Francisco	124	<b>PRESQUE ISLE</b>	
Seattle	122	Louisville	66,137	Tucson	75,143	Bangor	32,111
Syracuse	72,141	<b>PADUCAH</b>		<b>PIERRE</b>		Houlton	60,132
Tampa	123	Evansville	54,128	Muron	61,133	<b>PRINCE GEORGE</b>	
Toledo	123	Memphis	68,138	Rapid City	75,143	Ft. St. John	55,128
Toronto	72,141	<b>PALM SPRINGS</b>		Sioux Falls	75,143	Quesnel	76,144
Tucson	123	Las Vegas	64,135	<b>PITTSBURGH</b>		Smithers	76,144
Washington, D. C.	72,141	Los Angeles	66	Akron	24,105	Vancouver	76,144
West Palm Beach	123	Ontario	73,142	Allentown	26,107	<b>PRINCE RUPERT</b>	
Wilmington, Del.	72,141	San Diego	74,142	Atlanta	87	Sandspit	76,144
Worcester	72,141	<b>NORFOLK</b>		Baltimore	31,111	Terrace	76,144
Youngstown	72,141	Atlanta	87	Binghamton	33,112	Vancouver	125
		Baltimore	31,111	Birmingham	90		
		Charleston, S. C.	40,117	Boston	92		
		New Bern	71,140	Buffalo	37,115		
		Newport News	71,140				
		New York	71,140				
		Philadelphia	72,141				
		Washington, D. C.	72,141				

<b>PROVIDENCE</b>		<b>ROANOKE</b>		<b>ST. LOUIS (Continued)</b>		<b>SAN DIEGO</b>	
Baltimore	31,111	Charleston, W. Va.	41,118	Cincinnati	45,121	El Paso	-109
Boston	36,114	Greensboro	58,131	Cleveland	-100	Long Beach	66,136
Chicago	98	Pittsburgh	75,143	Dallas	-103	Los Angeles	66,137
Hartford	59,132	Washington, D. C.	77,145	Dayton	50,125	Palm Springs	74,142
New York	71,140	Winston-Salem	77,145	Des Moines	51,126	Phoenix	74,143
Washington, D. C.	76,144			Detroit	52,126	San Francisco	78,146
<b>PUEBLO</b>		<b>ROCHESTER, MINN.</b>		Evansville	54,128	<b>SANDSPIT</b>	
Colorado Springs	46,122	Chicago	98	Houston	-113	Prince Rupert	76,144
Santa Fe	76,144	Madison	67,137	Indianapolis	61,133	Vancouver	-126
<b>QUEBEC</b>		Minneapolis	69,139	Kansas City	63,134	<b>SAN FRANCISCO</b>	
Fredericton	56,129	Waterloo	77,145	Little Rock	65,136	Albuquerque	84
Montreal	70,140	<b>ROCHESTER, N. Y.</b>		Los Angeles	-117	Atlanta	88
Saguenay	76,144	Albany, N. Y.	25,106	Louisville	67,137	Baltimore	89
Seven Islands	76,144	Baltimore	31,111	Memphis	68,138	Boise	91
<b>QUESNEL</b>		Buffalo	37,115	Miami	-119	Boston	92
Prince George	76,144	Chicago	44,120	Nashville	71,140	Burbank	37,116
William Lake	76,144	Cleveland	46,122	New York	-122	Chicago	98
<b>RALEIGH</b>		Detroit	52,126	Oklahoma City	-123	Dallas	-103
Atlanta	29,109	Elmira	53,127	Philadelphia	-124	Denver	-105
Charlotte	41,118	New York	72,141	San Francisco	-125	Detroit	-107
Columbia	47,123	Philadelphia	74,142	Springfield, Mo.	78,145	El Paso	-109
Florence	54,128	Syracuse	77,145	Tampa	-125	Fairbanks	-109
Greensboro	58,131	Washington, D. C.	77,145	Washington, D. C.	-126	Fresno	56,130
New York	71,141	<b>ROCKLAND</b>		<b>ST. PETERSBURG</b>		Honolulu	-112
Pittsburgh	75,143	Augusta, Me.	30,110	Atlanta	29,109	Houston	-113
Richmond	76,144	<b>ROME</b>		Cincinnati	99	Las Vegas	65,136
Washington, D. C.	76,144	Atlanta	29,109	Cleveland	-101	Los Angeles	66,137
<b>RAPID CITY</b>		Chattanooga	42,119	Detroit	-107	Medford	67,137
Casper	39,116	<b>ROSWELL</b>		Louisville	-118	Miami	-119
Denver	51,125	Albuquerque	25,107	Miami	68,138	Monterey	70,139
Pierre	75,143	El Paso	53,127	New Orleans	-121	New York	-122
<b>READING</b>		Hobbs	60,132	Pittsburgh	-124	Oakland	73,141
Allentown	26,107	<b>ROUYN-NORANDA</b>		Washington, D. C.	-126	Ontario	73,142
Harrisburg	59,131	Val D'or	77,145	<b>SALEM</b>		Phoenix	-124
Lancaster	64,135	<b>SACRAMENTO</b>		Eugene	53,127	Portland, Ore.	-124
New York	72,141	Las Vegas	64,135	Portland, Ore.	75,143	Reno	77,145
Syracuse	77,144	Los Angeles	66,137	<b>SALINAS</b>		Sacramento	78,145
<b>REGINA</b>		Medford	67,137	Monterey	70,139	St. Louis	-125
Calgary	38,116	Reno	77,145	San Francisco	78,145	Salinas	78,145
Edmonton	53,127	San Francisco	78,145	Santa Barbara	78,145	Salt Lake City	-126
Swift Current	77,144	Stockton	78,145	<b>SALT LAKE CITY</b>		San Diego	78,146
Winnipeg	77,144	<b>SAGINAW</b>		Boise	35,113	Seattle	-126
Yorkton	77,144	Chicago	44,120	Casper	39,116	Stockton	78,146
<b>RENO</b>		Flint	54,128	Chicago	98	Washington, D. C.	-126
Boise	34,113	Grand Rapids	57,130	Denver	51,126	<b>SAN JUAN</b>	
Denver	-105	<b>SAGUENAY</b>		Ely	53,127	Miami	-119
Elko	53,127	Montreal	70,140	Great Falls	58,130	Philadelphia	-124
Oakland	73,141	Quebec	76,144	Idaho Falls	61,133	<b>SANTA BARBARA</b>	
Portland, Ore.	75,143	Seven Islands	78,145	Las Vegas	65,135	Los Angeles	66,137
Sacramento	77,145	<b>ST. JOHN</b>		Los Angeles	-117	Monterey	70,139
Salt Lake City	77,145	Fredericton	56,129	Minneapolis	-120	Salinas	78,145
San Francisco	77,145	Halifax	59,131	Oakland	-123	<b>SANTA FE</b>	
Seattle	-125	Moncton	70,139	Pocatello	75,143	Albuquerque	25,107
<b>RICHMOND</b>		Montreal	70,140	Portland, Ore.	-124	Clovis	46,122
Baltimore	31,111	Yarmouth	78,145	Reno	77,145	Pueblo	76,144
Charlotte	41,118	<b>ST. JOHNS</b>		San Francisco	-126	<b>SARASOTA</b>	
Danville	50,125	Gander	57,130	<b>SAN ANGELO</b>		Ft. Meyers	55,128
Greensboro	58,131	Sydney	78,145	Austin	30,110	Jacksonville	62,134
Greenville	58,131	<b>ST. LOUIS</b>		Midland	69,138	Orlando	73,142
New York	72,141	Atlanta	88	<b>SAN ANTONIO</b>		Tampa	78,146
Philadelphia	74,142	Baltimore	89	Atlanta	88	West Palm Beach	78,146
Raleigh	76,144	Chicago	44,120	Austin	30,110	<b>SASKATOON</b>	
Washington, D. C.	77,145	<b>ST. LOUIS</b>		Corpus Christi	48,124	Calgary	38,116
		Atlanta	88	Dallas	49,124	Edmonton	53,127
		Baltimore	89	El Paso	-109	Winnipeg	78,146
		Chicago	44,120	Houston	60,132		

<b>SAULT STE. MARIE</b>		<b>ST. LOUIS</b>		<b>TALLAHASSEE</b>		<b>TORONTO (Continued)</b>	
Ft. William	55,129	Denver	-106	Albany, Ga.	24,106	Ft. William	-110
Toronto	79,146	Huron	61,133	Atlanta	29,109	Moncton	-120
<b>SAVANNAH</b>		Minneapolis	69,139	Columbus, Ga.	47,123	Montreal	70,140
Atlanta	29,109	Pierre	75,143	Jacksonville	62,134	New York	72,141
Augusta, Ga.	30,110	Sioux City	79,146	Miami	68,138	North Bay	72,141
Brunswick	37,115	<b>SMITHERS</b>		Orlando	73,142	Ottawa	73,142
Charleston, S. C.	40,117	Prince George	76,144	Panama City	74,142	Sault Ste. Marie	79,146
Columbia	47,123	Terrace	79,146	Tampa	80,147	Sudbury	80,147
Jacksonville	62,134	<b>SOUTH BEND</b>		<b>TAMPA</b>		Tampa	-127
Macon	67,137	Chicago	44,120	Albany, Ga.	24,106	Vancouver	-127
<b>SCRANTON</b>		Ft. Wayne	55,129	Atlanta	29,109	Washington, D. C.	80,147
Allentown	26,107	<b>SPARTANBURG</b>		Baltimore	90	Windsor	80,147
Binghamton	33,112	Charlotte	42,119	Boston	92	Winnipeg	-127
Buffalo	37,115	Greenville	58,131	Buffalo	93,115	<b>TUCSON</b>	
New York	72,141	<b>SPOKANE</b>		Chicago	98	Bisbee	34,113
Philadelphia	74,143	Chicago	98	Cincinnati	-100	Chicago	98
Syracuse	79,146	Great Falls	58,130	Cleveland	-101	Dallas	-103
Williamsport	79,146	Minneapolis	-120	Columbus, Ohio	-101	El Paso	53,127
<b>SEATTLE</b>		Missoula	69,139	Daytona Beach	51,125	Los Angeles	66,137
Anchorage	85	Portland, Ore.	76,144	Jacksonville	62,134	New York	-123
Annette Island	85	Seattle	79,146	Lakeland	64,135	Phoenix	75,143
Boise	35,113	Yakima	79,146	Los Angeles	-117	<b>TULSA</b>	
Chicago	98	<b>SPRINGFIELD, ILL.</b>		Louisville	-118	Chicago	98
Dallas	-103	Chicago	44,120	Melbourne	67,138	Dallas	49,124
Denver	-105	<b>SPRINGFIELD, MO.</b>		Miami	68,138	Denver	-106
Fairbanks	-109	Joplin	63,134	Montreal	-121	Ft. Smith	55,129
Honolulu	-112	Kansas City	63,134	New Orleans	-122	Houston	60,132
Juneau	-114	Little Rock	66,136	Orlando	73,142	Joplin	63,134
Kodiak	-115	St. Louis	78,145	Panama City	74,142	Kansas City	63,134
Los Angeles	-117	<b>STEPHENVILLE</b>		St. Louis	-125	Nashville	-121
Miami	-119	Gander	57,130	Sarasota	78,146	Oklahoma City	73,142
Minneapolis	-120	Sydney	79,146	Tallahassee	80	St. Louis	78,145
New York	-122	<b>STOCKTON</b>		Toronto	-127	Shreveport	79,146
Portland, Ore.	75,144	Modesto	69,139	<b>TEMPLE</b>		Wichita	80,147
Reno	-125	Sacramento	78,145	College Station	46,122	<b>VAL D'OR</b>	
San Francisco	-126	San Francisco	78,146	Waco	80,147	Ottawa	74,142
Spokane	79,146	<b>SUDBURY</b>		<b>TERRACE</b>		Rouyn-Noranda	77,145
Vancouver	79,146	North Bay	72,141	Prince Rupert	76,144	<b>VANCOUVER</b>	
Victoria	79,146	Timmins	80,147	Smithers	79,146	Calgary	38,116
Yakima	79,146	Toronto	80,147	Vancouver	80,147	Comox	48,123
<b>SEVEN ISLANDS</b>		<b>SWIFT CURRENT</b>		<b>TERRE HAUTE</b>		Edmonton	-108
Quebec	76,144	Regina	77,144	Indianapolis	62,133	Honolulu	-112
Saguenay	78,145	<b>SYDNEY</b>		<b>TEXARKANA</b>		Montreal	-121
<b>SHERIDAN</b>		Halifax	59,131	Ft. Smith	55,128	Prince George	76,144
Billings	33,112	St. Johns	78,145	Shreveport	79,146	Prince Rupert	-125
Casper	39,116	Stephenville	79,146	<b>TIMMINS</b>		Sandspit	-126
<b>SHREVEPORT</b>		<b>SYRACUSE</b>		Sudbury	80,147	Seattle	79,146
Alexandria	25,107	Albany, N. Y.	25,106	<b>TOLEDO</b>		Terrace	80,147
Atlanta	88	Allentown	26,107	Akron	24,105	Toronto	-127
Beaumont	32,112	Baltimore	31,111	Chicago	44,120	Winnipeg	-127
Dallas	49,124	Binghamton	33,112	Cleveland	46,122	<b>VERO BEACH</b>	
Ft. Worth	56,129	Boston	36,114	Columbus, Ohio	48,123	Melbourne	68,138
Hot Springs	60,132	Buffalo	37,115	Detroit	52,126	Ocala	73,141
Houston	60,132	Los Angeles	-117	Ft. Wayne	55,129	<b>VICTORIA</b>	
Jackson	62,134	New York	72,141	Milwaukee	69,139	Seattle	79,146
Little Rock	65,136	Ottawa	73,142	New York	-123	<b>VISALIA</b>	
Memphis	68,138	Philadelphia	74,143	Pittsburgh	75,143	Bakersfield	30,110
Monroe	70,139	Reading	77,144	Washington, D. C.	80,147	Fresno	57,130
New Orleans	71,140	Rochester, N. Y.	77,145	<b>TORONTO</b>		<b>WACO</b>	
Texarkana	79,146	Scranton	79,146	Buffalo	37,115	Austin	30,110
Tulsa	79,146	Washington, D. C.	80,147	Calgary	93	Dallas	50,124
<b>ST. LOUIS</b>		<b>STOCKTON</b>		Chicago	44,120	Ft. Worth	56,129
Omaha	73,142	Modesto	69,139	Cleveland	46,122	Temple	80,147
Sioux Falls	79,146	Sacramento	78,145	Edmonton	-108		
Waterloo	79,146	San Francisco	78,146				

## WASHINGTON, D. C.

Akron	- - - - -	24,105
Allentown	- - - - -	26,107
Atlanta	- - - - -	88
Atlantic City	- - - - -	29,109
Baltimore	- - - - -	32,111
Bermuda	- - - - -	90
Birmingham	- - - - -	90
Boston	- - - - -	36,114
Buffalo	- - - - -	37,115
Charleston, W. Va.	- - - - -	41,118
Charlotte	- - - - -	42,119
Chattanooga	- - - - -	95
Chicago	- - - - -	99
Cincinnati	- - - - -	45,121
Cleveland	- - - - -	46,122
Columbia	- - - - -	47,123
Columbus, Ohio	- - - - -	48,123
Dallas	- - - - -	104
Dayton	- - - - -	50,125
Denver	- - - - -	106
Detroit	- - - - -	52,127
Ft. Lauderdale	- - - - -	110
Greensboro	- - - - -	58,131
Harrisburg	- - - - -	59,131
Hartford	- - - - -	59,132
Houston	- - - - -	113
Huntington	- - - - -	113
Huntsville	- - - - -	61,133
Jacksonville	- - - - -	114
Kansas City	- - - - -	115
Knoxville	- - - - -	64,135
Lancaster	- - - - -	64,135
Louisville	- - - - -	118
Memphis	- - - - -	118
Miami	- - - - -	119,138
Milwaukee	- - - - -	120
Minneapolis	- - - - -	120
Montreal	- - - - -	121
Nashville	- - - - -	121
Newport News	- - - - -	71,140
New York	- - - - -	72,141
Norfolk	- - - - -	72,141
Philadelphia	- - - - -	74,143
Pittsburgh	- - - - -	75,143
Providence	- - - - -	76,144
Raleigh	- - - - -	76,144
Richmond	- - - - -	77,145
Roanoke	- - - - -	77,145
Rochester, N. Y.	- - - - -	77,145
St. Louis	- - - - -	126
St. Petersburg	- - - - -	126
San Francisco	- - - - -	126
Syracuse	- - - - -	80,147
Toledo	- - - - -	80,147
Toronto	- - - - -	80,147
West Palm Beach	- - - - -	127
Wilmington, Del.	- - - - -	80,147

## WATERLOO

Chicago	- - - - -	44,120
Des Moines	- - - - -	51,126
Rochester, Minn.	- - - - -	77,145
Sioux City	- - - - -	79,146

## WATERVILLE

Portland, Me.	- - - - -	75,143
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## WATSON LAKE

Ft. Nelson	- - - - -	110
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## WAYCROSS

Jacksonville	- - - - -	63,134
Macon	- - - - -	67,137

## WEST PALM BEACH

Chicago	- - - - -	99
Daytona Beach	- - - - -	51,125
Ft. Lauderdale	- - - - -	55,128
Ft. Meyers	- - - - -	55,128
Jacksonville	- - - - -	63,134
Melbourne	- - - - -	68,138
Miami	- - - - -	69,138
New York	- - - - -	123
Orlando	- - - - -	73,142
Sarasota	- - - - -	78,146
Washington, D. C.	- - - - -	127

## WHITEHORSE

Fairbanks	- - - - -	109
Ft. Nelson	- - - - -	110

## WICHITA

Albuquerque	- - - - -	84
Amarillo	- - - - -	27,107
Denver	- - - - -	51,126
Kansas City	- - - - -	63,134
Oklahoma City	- - - - -	73,142
Tulsa	- - - - -	80,147

## WICHITA FALLS

Dallas	- - - - -	50,124
Ft. Worth	- - - - -	56,129
Lawton	- - - - -	65,136
Lubbock	- - - - -	67,137

## WILLIAM LAKE

Quesnel	- - - - -	76,144
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## WILLIAMSPORT

Elmira	- - - - -	53,127
Harrisburg	- - - - -	59,131
Philadelphia	- - - - -	74,143
Pittsburgh	- - - - -	75,143
Scranton	- - - - -	79,146

## WILMINGTON, DEL.

Baltimore	- - - - -	32,111
New York	- - - - -	72,141
Washington, D. C.	- - - - -	80,147

## WILMINGTON, N. C.

Charleston, S. C.	- - - - -	40,117
Fayetteville	- - - - -	109

## WINDSOR

Toronto	- - - - -	80,147
Winnipeg	- - - - -	127

## WINNIPEG

Edmonton	- - - - -	108
Fargo	- - - - -	54,128
Ft. William	- - - - -	55,129
Grand Forks	- - - - -	57,130
Minneapolis	- - - - -	69,139
Regina	- - - - -	77,144
Saskatoon	- - - - -	78,146
Toronto	- - - - -	127
Vancouver	- - - - -	127
Windsor	- - - - -	127

## WINSTON-SALEM

Greenville	- - - - -	58,131
Roanoke	- - - - -	77,145

## WORCESTER

Boston	- - - - -	36,114
Lawrence	- - - - -	65,136
Manchester	- - - - -	67,137
New York	- - - - -	72,141

## YAKIMA

Portland, Ore.	- - - - -	76,144
Seattle	- - - - -	79,146
Spokane	- - - - -	79,146

## YARMOUTH

St. John	- - - - -	78,145
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## YORKTON

Regina	- - - - -	77,144
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## YOUNGSTOWN

Akron	- - - - -	24,105
New York	- - - - -	72,141
Philadelphia	- - - - -	74,143
Pittsburgh	- - - - -	75,143

1

Ocean

Pacific



TO VANCOUVER  
TO SEATTLE  
TO PORTLAND  
TO SAN FRANCISCO  
TO LOS ANGELES

TEXAS

2

MANITOBA

ONTARIO

QUEBEC

MAINE

N B

MINNESOTA

WISCONSIN

MICH

NEW YORK

IOWA

OHIO

ILLINOIS

INDIANA

W VA

MISSOURI

KENTUCKY

VIRGINIA

ARKANSAS

TENNESSEE

NC

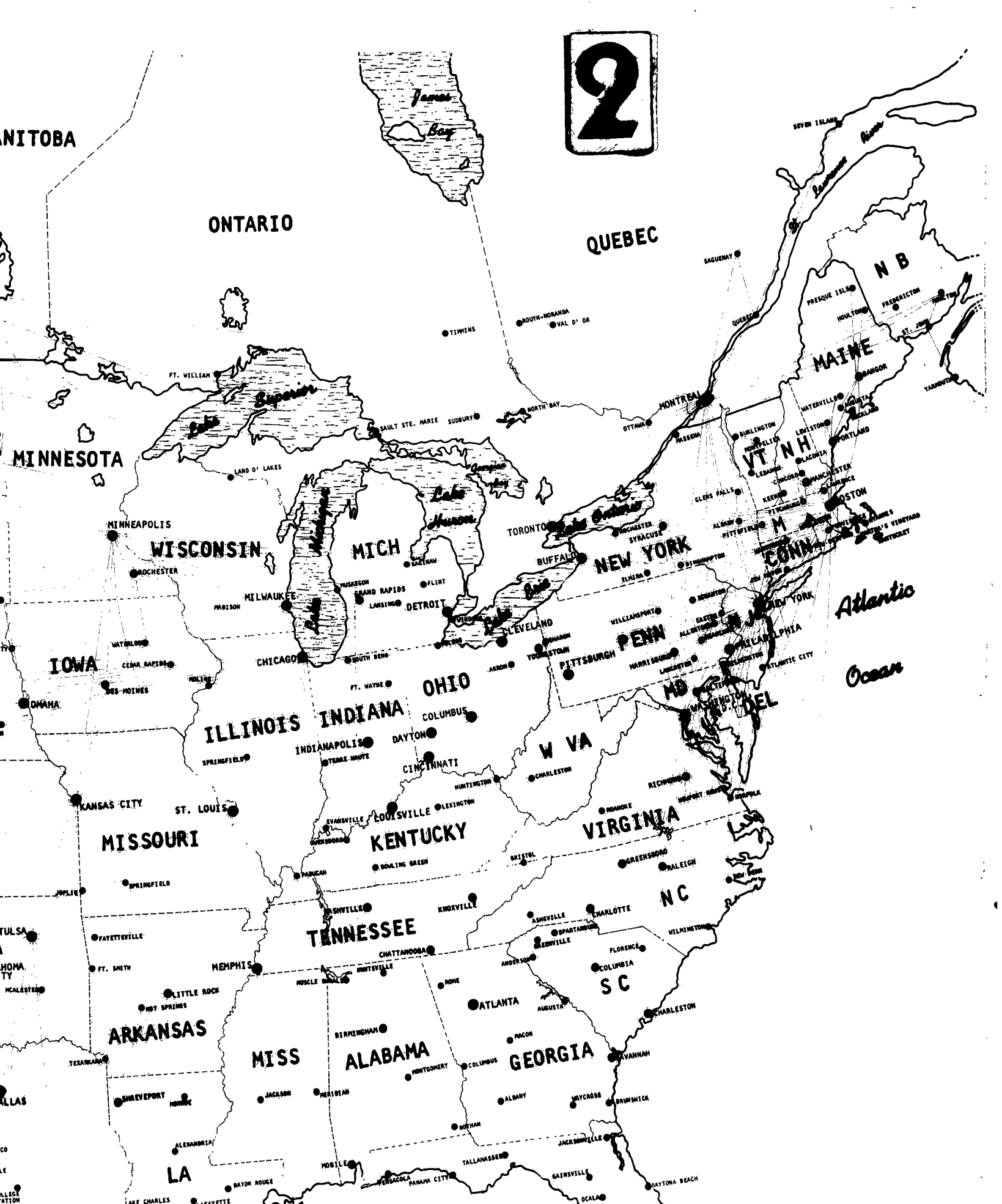
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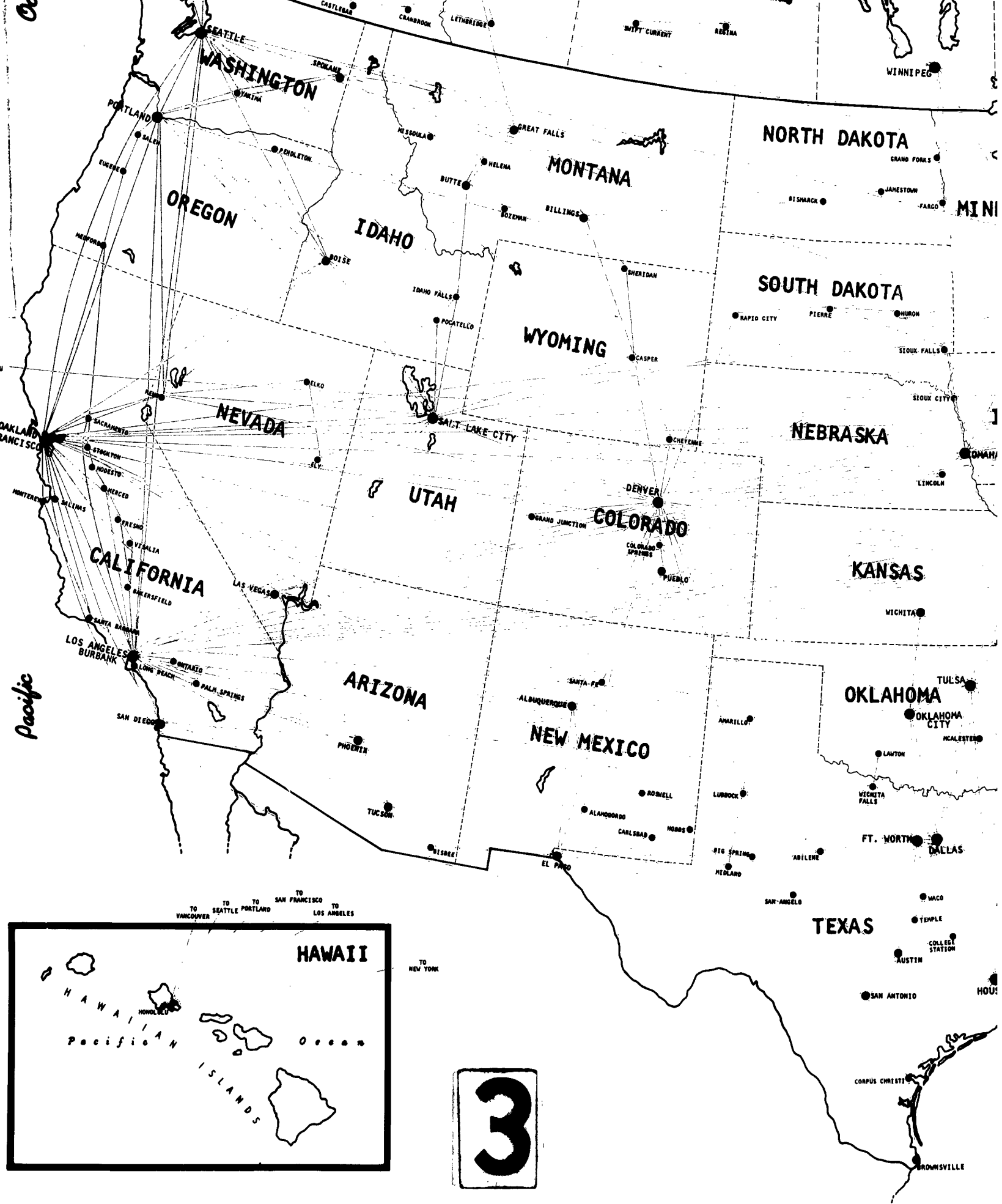
ALABAMA

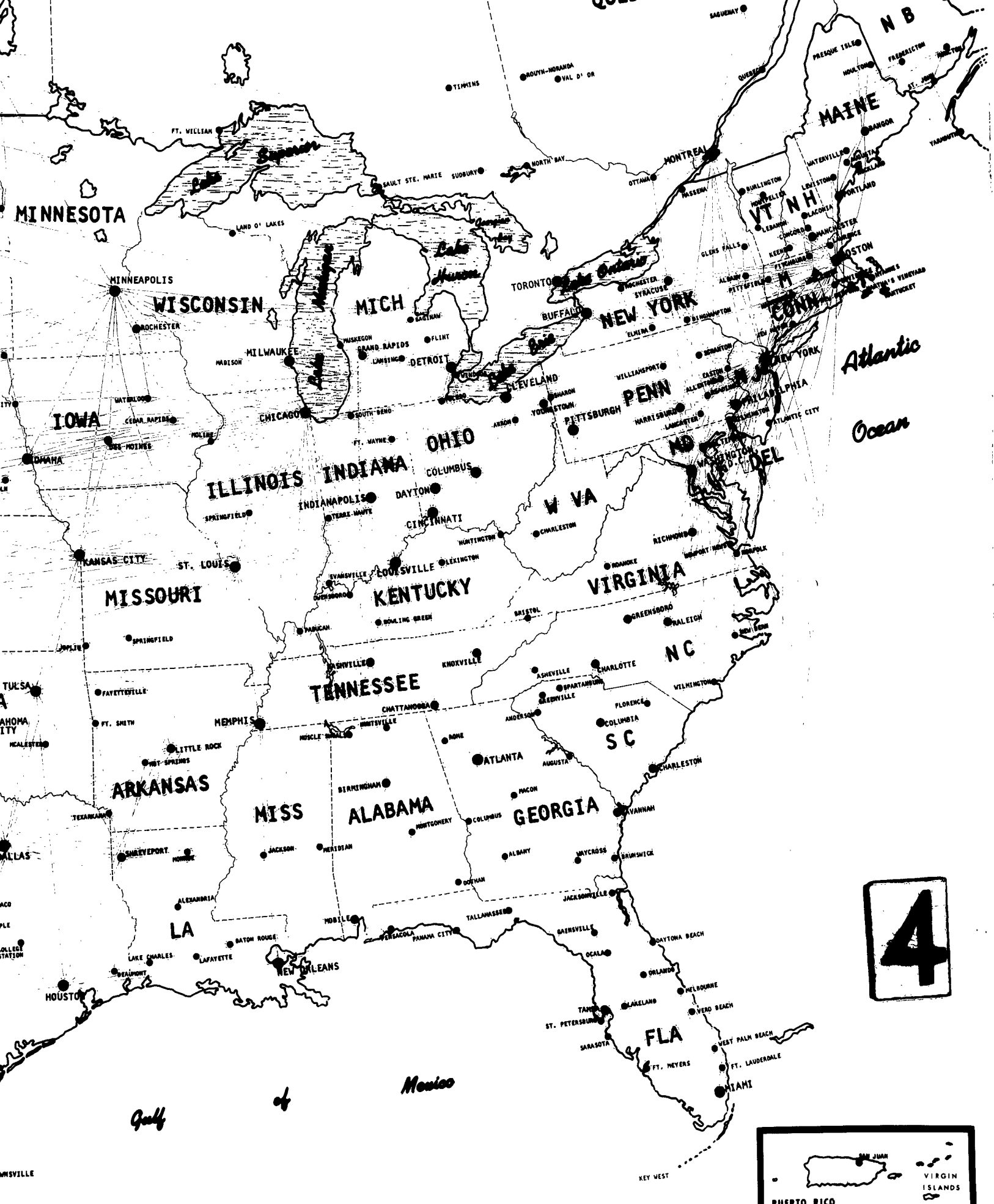
GEORGIA

LA

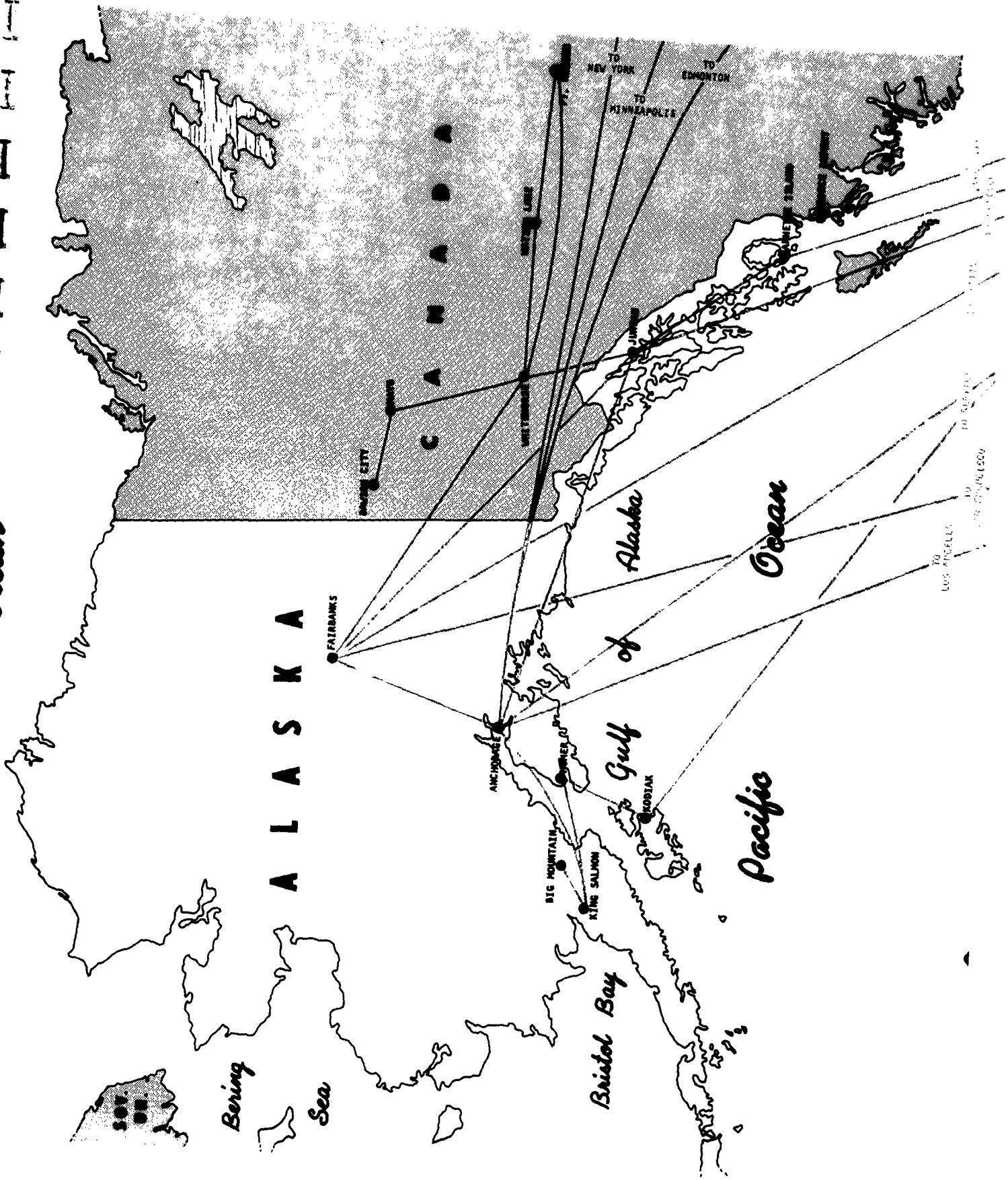
Atlantic Ocean







Arctic Ocean



Bering Sea

ALASKA

FAIRBANKS

ANCHORAGE

BIG MOUNTAIN

KING SALMON

Bristol Bay

KODIAK

Gulf of Alaska

Pacific Ocean

Ocean

CANADA

CALGARY

WINNIPEG

MINNEAPOLIS

ST. LOUIS

LOS ANGELES

NEW YORK

EDMONTON

LOS ANGELES

ST. LOUIS

MINNEAPOLIS

WINNIPEG

CALGARY

SOV. UNION